University of Alberta

Designing Simulation Environments for the Preparation of School Administrators

by

David Arthur Mappin ©

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partial fulfillment of the requirements for the degree of Doctor of Philosophy

in

Administration of Post-Secondary Education

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled *Designing Simulation Environments for the Preparation of School Administrators* submitted by David Arthur Mappin in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Administration of Post-Secondary Education.

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Abstract

Between 1984 and 1995 Project Decide, an ongoing curriculum development project in the Faculty of Education at the University of Alberta, explored alternative methods for the preparation of school principals, particularly methods involving experiential learning, simulations, and reflection-in-action. Four approaches to simulations were designed: a random access videotape simulation of an elementary school principalship with a file box of background materials; an interactive videodisc version; a paper version; and a full multimedia simulation of a junior high school principalship (which has not yet been completed). This study chronicled developments during the life of the project and examined the issues related to student learning arising from the use of the interactive videodisc version of the simulation to provide an experiential learning situation for graduate students in educational administration. Data were gathered during three course sessions between 1990 and 1992. A combination of qualitative research methods, including observations, interviews, and document analysis was undertaken to explore student learning about the principalship and the effectiveness of the simulation design and the learning system in which it was embedded. The findings support the use of experiential simulations for this type of learning and noted a strong positive influence on student motivation, useful learning in areas not addressed through conventional instruction, and an integration of scholarly writing with practice in ways students reported to be very useful. In addition, suggestions for improvement of the simulation design emerged from the study.

Key words: administrator preparation, simulation, experiential learning, situated cognition, constructivism, qualitative research.

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Chapter One

Introduction

The Simulation Environment

It is a large, bright room with a warm feeling attributable to the reddish-orange colour in the furnishings and the decorative brick. When you enter the room the arrangement of the dividers and study carrels draws your eye far into the space. As you walk further in you become aware that it is not as quiet as a traditional study area might be. You become aware of two or three voices seemingly involved in telephone conversations. "I'm sorry, Mrs. Hoyme," one might be saying, "but we can't move that quickly. The paving contract will have to be tendered." From across the room another voice drifts back. "Listen, Mr. Wanetchko, I'm sorry about your son, but the skating rink is community property and we at the school cannot take responsibility for what happens there once school is out." You notice that there are more than two or three persons here and they seem to be working at computer terminals. Off to your right a laser printer whirs and clicks continually like some demented cricket.

When you step closer to one of those at a computer terminal you can readily see that person is tethered to a computer-videodisc work station by a short headset cord, intensely engaged in what they are doing: reading bits of computer generated text, examining hand written notes somehow displayed on the screen, and occasionally reacting to a video presentation on their computer screen. This individual opens other screens and types information, sometimes shifting in their chair, sometimes sighing, sometimes referring to hand written notes he or she has placed at their work station in a convenient place. Then their rotary dial telephone rings, reminding you of what first caught your attention. The headset is tugged off with an impatient movement and the handset grabbed impatiently. "Good afternoon, this is Stacey Metzger at Pembina Elementary School," they say with some authority, trying not to sound vague or harassed. Someone at the other end of the line is speaking so emotionally you can sense the depth of their feeling through the tone of the indistinguishable words which reach you where you stand, and you notice the person you are observing is listening intently.

This scene could present itself to any observer entering the location of the Project Decide simulation lab in mid-simulation. Scattered around the large room would be twelve students absorbed in trying to finish the 24 or so problems presented to them in the course of a 135 minute work session in their "simulated principal's office." The instructor would be found occasionally circulating amongst the students, observing, but discreetly keeping his distance unless they indicated they needed to speak with him about some problem. This would be one of three simulation work sessions embedded in a three credit University of Alberta course currently designated as Ed Adm 595: The School Principalship: Seminars and Simulations. The first simulation is set in the first week of school in September. The second simulation is set in mid-November just after the first report cards have been sent out. The third is set in mid-March just as the winter is beginning to ease, with considerations of how students will finish up the year, and budget matters for this year and next, among the seasonal concerns. In each simulation the student assumes the role of the newly appointed principal of Pembina Elementary School, Stacey Metzger. The materials are designed with this in mind, so all of the text and especially the video are offered from the point of view of the principal. In the case of the video sequences this means that the camera becomes the principal's eyes and almost everything is seen as the principal would see it, a Stacey's eye view of the world.

The course is offered to graduate students in the Educational Administration programs at the University of Alberta. It offers an alternative learning experience which attempts to bridge the actual work of a principal, with scholarly ideas and theory, and with the personal attributes and values of the candidates. At the same time it supports this learning in a style which will help students incorporate ideas of reflection and considered judgement into their work style when they actually undertake a principalship, or in the case of many students, when they return to one.

This study grew out of five years of research and development in instructional simulations in educational administration which sought to address some of the perceived problems with graduate programs in educational administration. It now covers a decade of work and seeks to document those achievements, to assess the effectiveness of simulations in the learning of graduate students, to improve the design of the simulations and the learning environment in which they are used, and to use the experience to further inform our understanding of how administrators move from being a novice to being a skilled practitioner. In establishing the foundation for the remainder of this report it seems useful to examine some of the background concerns about the education of principals and educational administrators generally, and follow this with a reflection on the possible significance of the development work and this research study, a statement of the research questions, and an overview of how the study was undertaken.

Improving Professional Preparation

Much of the recent work on the professional preparation of educational administrators, specifically principals, seems motivated by the perception that traditional instructional methods in university-based programs do not adequately link academic preparation and professional experience. This process of translating theory into practice, or at least linking theory and practice in some useful way, has been seen to be necessary to training and/or educating a skilled and reflective practitioner (Milstein, 1993; Murphy, 1993; Pitner, 1988; Griffiths, 1988; Peterson & Finn, 1988; Wendel & Bryant, 1988). In addition, current graduate education approaches to the development of principals have been criticized for being too theoretical (Manasse, 1985; National Commission on Excellence, 1987; Peterson & Finn, 1988; Wendel & Bryant, 1988).

Most of these critical analyses extend their brief to offer the suggestion that some sort of clinical experience must be included in graduate education to achieve an effective form of linkage between theory and practice.

In addition, McIntosh, Maynes, and Mappin (1988) have described five areas of learning in educational administration which are resistant to classroom-based studies and consequently tend to be neglected in graduate programs, but which can be dealt with in a clinical experience:

1. the personal demands exacted by the professional role, especially those demands which are not easily or meaningfully communicated "by the book";
2. one's personal "fit" with the demands of the role - - that is, the degree to which the work one is called upon to do matches (or can be brought into comfortable alignment with) the personal strengths, values and aspirations

of the trainee;

3. the management and human relations skills needed for role performance, including time management and conflict management;

4. the development of problem-analysis capabilities - - that is, what Vickers (1965) refers to as the ability to "appreciate" the situations which the professional faces and to exercise sound judgment in them; and

5. the development of personal resilience and sensitivity, and related skills, in order to monitor one's role performance and to seek to develop and implement more sophisticated conceptions of how the role can be performed. (p. 1)

Two problems must be addressed in selecting appropriate clinical methods for preparation programs in educational administration. The first of these may be described as ensuring that any administrative experience is not substituted for a student's opportunity to exercise responsibility. That is, it is vitally important for trainees to have the responsibility of acting and accepting the consequences of their actions in a clinical experience, not just for being able to observe a broad variety of events, as is often the case in administrative practica.

The second problem which should be considered may be called the present practice versus preferred practice dilemma. In virtually all clinical experiences a student learns how things are currently done, not how they might be, or even should be, done. This limits the rate of change possible within the profession and the value of the practical part of an administrator's education.

The Possible Contributions of Simulations

The methods proposed for the clinical experience are usually those of a practicum or an internship, although experiential simulations would seem to offer great promise.

The use of simulation methods has been increasingly advocated in some areas of professional training, particularly business and medicine, and they have been demonstrated to have much promise for professional education. They are only now, however, being carefully examined for their possible contributions to graduate programs in educational administration. Writers such as Pitner (1988) and Griffiths (1988) suggested their use some years ago, but there are relatively few examples of simulations which have been prepared and utilized in this area, and none yet which offer the situational complexity and opportunities for personal growth which the Project Decide simulation course does. Perhaps the closest to the University of Alberta approach are two sets of materials which have been developed in the United Kingdom: the Quality Management In Schools (QMS) interactive video materials developed by the Northern Ireland Centre for Learning Resources in Belfast (Northern Ireland Centre for Learning Resources, n.d) and the Strathlethan videodisc/CD-i materials, which have been developed "to support the professional development of existing and potential Primary Headteachers" (McLeod, n.d) by the Grampian Regional Council, Education Department Resource Services in Aberdeen, Scotland. Both these works present video scenarios of various situations, but they are from a 'third person' point of view, in which one sees all the participants in a situation, but is not expected to cast oneself in a role. Neither do these materials provide the rich context of teacher, student, and other files, and references which characterize the simulation materials of Project Decide. The pedagogy used with the materials is more like that of a case study approach. The recommended use of both groups of materials calls for the leader to avoid the presentation of right and wrong answers to the situations. Preliminary reports of field research undertaken by the Grampian Regional Council (McLeod, 1994; McLeod, 1995; Mortimer, 1994) indicate a positive and enthusiastic response to this form of training by educators in Scotland.

In the United States there has been one recent doctoral dissertation (O'Leary, 1994) which describes the potential and need for simulations in this area and the development of one multi-player simulation game. This multi-player game simulates operations in a school district over two years between players representing three school districts, the media, the state education department, the business community, and a university (O'Leary, 1994, p. 105). This game was tested in March of 1994 at Hofstra University with a group of twenty-six educational administrators and teachers. At the completion of play the participants completed a comprehensive survey and were also given the opportunity to provide written comments as a part of the debriefing process. These players reported very positive learning about the political, economic, and social structures of school districts and their interplay in dealing with a variety of issues (O'Leary, 1994). Twenty-one of the 26 educators involved in the Hofstra trial "expressed enthusiasm for this type of learning" (p. 129).

The University Council for Educational Administration (UCEA) has also begun the development of an extensive simulation, called the Information Environment for School Leader Preparation Project (UCEA Review, 1993).

Antecedents: The Beginnings of the Project

The Department of Educational Policy Studies at the University of Alberta has attempted to explore this new method of providing clinical experiences for educational administrators through the creation of a simulation environment for use within a seminar course on the principalship (McIntosh, Maynes, & Mappin, 1988; Mappin, McIntosh & Maynes, 1989). This development began in 1984.

From initial ideas developed by Dr. Gordon McIntosh and Dr. Ernie Ingram based on earlier in-basket materials developed at the University of British Columbia by Dr. Walter Hartrick, and a widespread tradition of using case studies and in-basket simulations in the preparation of administrators and managers, the Project Decide simulations germinated. Within eighteen months and the expansion of the team to include David Mappin and others, a version of this instructional innovation was developed and the theoretical approach had shifted to an emphasis on experiential learning developed by David Kolb (1984). It was further enhanced by combining experiential learning with the ideas of reflective practice developed by Donald Schön (1983, 1987) and, more recently, with other new ideas of learning based in cognitive psychology, such as solving ill-structured problems (Spiro, Feltovich, Jacobsen, & Coulson, 1991; Voss, 1989) and situated cognition (Lave & Wenger, 1991; Brown, Collins, & Duguid, 1989). A computer based interactive video system, the IBM Infowindows system, was used to develop the first versions of the computer based interactive video simulations. Very positive student response to initial versions of the materials suggested a good deal of promise for this type of simulation approach.

The Emergence and Significance of the Study

This research was originally conceived in 1989 as the project development team began the transition of the program design from the paper documents and random access videotape which characterized the first version, to the more powerful computer-based interactive video system. The very enthusiastic response of students to the initial version was not well explained by the 25 question surveys and the comments appended to them which the development team used as a monitoring and formative evaluation tool during the first years of implementation. Despite their enthusiasm, it was not clear exactly what they might have been learning. In addition, other questions intriguing to the researcher kept surfacing in class seminars and team discussions. Did the simulation have any impact on problem solving by the participants? How did students go about developing a deep understanding of the problem and making judgements about their course of action? How real did students see the simulation as being, and how real did it have to be to work instructionally?

This researcher decided to pursue the present study during the implementation and use of the computer-based interactive video version of the course as it complemented his interests in the design of effective instruction, the psychology of learning, and the use of simulation methods for the preparation of professionals. Such research would also provide useful information to the development team and course instructors as they worked to make the Pembina Elementary School simulation course as effective as possible, and as they began to contemplate the development of a junior high school simulation to be used in the preparation of secondary school principals. In a wider context the research could also contribute to an understanding of how experiential simulations could be used in the preparation of educational administrators and other professionals and it could help advance knowledge about the use of combined simulation/information environments for learning. The research is seen to be important, as well, in advancing methods for assisting administrators to make more lifelong use of theoretical concepts in their work by establishing a link between theory and practice for themselves. It may also help describe new approaches to understanding the importance of scholarly writing to administrators in the enactment of their roles.

The Research Questions

This research project was developed to explore the learning that goes on in the principalship simulation course and specifically how that learning is influenced by the design of the simulation experience. Given the current lack of similar work to provide a foundation, the study has been designated an exploratory case study using an interpretive study methodology.

The research described and interpreted the development, implementation, and evaluation of simulation materials for the preparation of school administrators over the course of a decade. As the description and interpretation unfolded four general questions guided the inquiry:

a. What can we discern about what students are learning in the simulation course based on the Pembina Elementary School simulations? What facilitates this learning? What gets in the way?

b. How well does the current design for the simulation materials, with its various electronic sources of information, assist students to establish a useful, ongoing linkage between knowledge obtained through academic preparation and knowledge obtained through the problems they face in professional practice? To what extent does this environment assist in developing their understanding of the administrative role?

c. How has the experience with the simulation course informed our current understanding of the process through which an administrator moves from an unskilled, or novice, position to that of a skilled, reflective practitioner? To what extent can this be related to activities which are possible within a graduate education program, especially those involving simulations?

d. Using the experiences with the Project Decide simulation materials and current relevant theoretical and scholarly writing, what advanced design might be crafted for a simulation/information environment for the training/education of administrators?

The Research Study

To pursue these questions an exploratory case study approach using interpretive methodology was chosen. The argument for and details of this choice are presented in chapter 4. The study itself was undertaken using a pilot study to test observation and interview approaches during the summer of 1990. This was followed by observations and interviews in two classes during two terms, the winter term which began in January of 1991, and the winter term of January 1992. During these research activities all class meetings were monitored and during each of the three labs one student was closely observed, and then interviewed regarding the simulation work, learning, and the course in general. Both of the instructors who taught the course more than once were interviewed. Additional data were obtained from student journals, class interviews, and class surveys of these and other classes.

The report of this research is presented in the remainder of this dissertation. In the next chapter, a more complete context is provided through a description of the development and use of the initial version of the simulation which led up to the present study. Chapter 3 offers support for the conceptualization of the simulation and related pedagogical ideas and for the approach taken to the study through a review of the literature. Chapter 4 examines the methodology of the study and the rationale for it. In the following two chapters the information and perceptions obtained from the participants are presented along with an interpretation. The first of these, Chapter 5, deals specifically with the simulation environment and the course and, following that, Chapter 6 explores dimensions of student learning from the simulation. In Chapter 7 a consolidation of the results of the research, synthesized to address the four research questions, is presented, and finally in Chapter 8, there is a brief summary and some implications of this work for further study, and for the field.

Chapter 2

Early Efforts

The evolution of the first computer based interactive video simulation took seven years. It began with an effort to conceptualize a series of critical incidents, and progressed rapidly to a form of simulation based on paper files and random access videotape. This chapter describes the development and use of this initial simulation, and how it influenced the development of the computer based interactive video version.

The Initial Version of the Simulation

The development effort began in 1983 when Dr. Gordon McIntosh used a study leave to assemble a series of critical incidents related to the principalship for study and possible inclusion in a series of 'in-basket' exercises to improve preparation programs for graduate students interested in the principalship. In the fall of 1983 Dr. McIntosh, together with his colleagues Dr. Ernie Ingram and Dr. Ken Ward, assembled a steering committee to guide the work of what would become Project Decide. The Project Decide Steering Committee comprised an Associate Superintendent with the Edmonton Public Schools, Richard Baker; two members of the Central Office staff of Edmonton Public, Milt Halvorson and Andre Durand, and the Director of the Instructional Technology Centre, David Mappin. An Advisory Board of five principals was also established. The five principals were Kaye Chernowski, Bob Holmes, Thor Lerohl, Warren Fisher, and Peter Wyllie, who had contributed the majority of the critical incidents collected during Dr. McIntosh's interviews in the 1983-84 school year. A series of meetings was held to validate the incidents which had been gathered and to begin discussions of meaningful new ways to use these materials in administrator education.

Discussions of media use at this time explored ways that slides, graphics, videotape, or other media could be used to enhance the presentation of the incidents. Suggestions were made that the floor plan of the school could be presented with photographs of each room to give students a sense of the physical plant, or that each teacher could be presented photographically to create a more realistic presence.

Over the course of the 1983-84 academic term the group evolved a particular format for several 'in-basket' exercises for students based on the critical incidents which would be embedded in a graduate course on the principalship. The exercise would have paper files for teachers and students, and some relevant information on school district policies and school policies. Each student would assume the role of a new principal at an elementary school and take the responsibility for working through each problem presented keeping in mind a longer term vision of what the school could be, as well as the immediate concerns. It differed from earlier approaches to administrative in-basket exercises in that it would also use videotape to introduce the outgoing principal of the school, the school superintendent, and the chair of the school board to the student.

In the Fall and Winter Terms of 1984-85 a team of graduate students was assembled in a graduate course to work with the pool of incidents, with the school system advisory people, and with the Faculty of Education team, to convert the descriptions of the incidents into an in-basket format for presenting the simulations. Each item was to require action on the part of students doing one of three simulations or the practise session as a part of their activity in a new course focused specifically on the problems of the elementary school principalship. As a part of the work the number of incidents was carefully balanced in five categories drawn from a typology of administrative tasks developed by Miklos (1984). The final balance was to reflect the relative proportion of each of the five categories estimated by project participants to be experienced by an elementary school principal in a given year. It had also been decided that the incidents would be used to develop four in-baskets for use in the new course. This was later reduced to three, both because of limitations of time in the course, and the need to eliminate items which were weak, unsuitable, or repetitious in the judgment of the Faculty of Education development team.

Throughout that winter the proposed school acquired a name, Pembina Elementary School, and it was placed in a fictitious Alberta school jurisdiction, the Rutherford School District. Although the new school district was in many respects, such as school-based management, patterned on the practices of the Edmonton Public Schools, it was also proposed to have some characteristics which were unlike those of Edmonton Public. As a consequence the new school jurisdiction acquired a policy manual which was written by a graduate student, Wilf Green, who was himself superintendent of a small school jurisdiction at that time. The Rutherford School District policy manual was adapted from a number of school board policy manuals in use in mid-sized school jurisdictions in Alberta. Pembina Elementary acquired a teaching and support staff with the imaginative assistance of the graduate students, and with a great deal of help from Milt Halvorson, who was then attached to the Personnel Department at the Edmonton Public School Board, and who provided files of real teachers and other staff members for the project, with suitable changes to ensure anonymity. In a similar way pupils required by the incidents were described and files were generated for them with the help of the principals involved with the project.

To provide a dimension of reality which included seemingly real people with personalities and the conflicts and politics which attend them, the ideas for the use of video continued to expand. There were two essential roles devised for the use of the video materials in the project: as a fundamental part of the orientation and as one method of providing in-basket items. Towards the end of the winter of 1985 scripts were developed for these video materials. New students' orientation to the course was to consist of two video programs. The first of the video programs included a meeting with the school superintendent and his associate and a tour of the community with a member of the school board. The meeting with the superintendent provided information regarding the operation of the school system as a whole and the philosophy for its operation. The tour with the school board member provided insight into the community at large. Not surprisingly, the meeting with the outgoing principal on the second videotape provided a view of the school, school operations, and the school district as a whole which differed from that of the school superintendent. This second tape also provided a visual orientation to the physical plant of the school to augment the paper school plan in their file box.

By this time the concept for the video materials also involved the use of random access videotape to permit the presentation of specific in-basket items or to provide video support for items at necessary moments during the simulation without having to watch long pieces of unrelated material. The video clips offered in this way differed in length from ten or fifteen seconds through almost four minutes. Some of these items were to be in the regular group of items, but one or two in each in-basket were to be "timed interrupts" to help reproduce the fragmented work of a principal more faithfully. This was achieved through the provision of envelopes which were to be opened at specific times during the simulation. Inside the envelopes were directions to a particular random access location on the videotape presenting a video clip which presented that problem.

Another feature of the simulation developed through this time period was the idea to incorporate telephone calls to the participants using the internal telephone system in the Faculty of Education. A series of three calls was developed for each in-basket exercise. The calls were to come from a variety of sources, as diverse as concerned parents, members of the community, and other school administrators.

These relatively complex in-basket simulations were created to be a part of a course which would place the problem solving activities in a context and which would also take advantage of the previous administrative knowledge base of students, whether they were inexperienced administrators or practised professionals. Recognizing the importance of debriefing seminars to learning from simulations (Lederman, 1984; LeVan & Carley, 1984) the course provided for one or more discussion sessions following each In-Basket laboratory. To allow for the presentation of additional concepts, and to develop particular ideas which emerged in the debriefing seminars a number of tutorial sessions were also provided. This number might be four or five depending on the interests and needs of a particular class group. Related to these were several role plays in which students were guided into more pro-active thinking about their school and their relationship with people within it than was likely during the simulations themselves. For example, in one role play session titled *Staff Dynamics* students would interview a problem staff member in an effort to get at the truth of a particularly difficult situation which had been featured in In-Basket 2 (see Appendix "A" for typical course outline). As a background for all of this work, and for individual thinking about the meaning of being a school principal and the sort of school one might wish to serve as principal, a book of readings was developed during the first two years the course was offered.

During the winter of 1984-85 the work of David Kolb (1984) on experiential learning came to the attention of the team. Library research was done and a theoretical conceptualization for the design of student activities using experiential learning in a simulation context was begun. This has been developed and enhanced by the team since that time.

The video materials for this first version of the course were produced by the Instructional Technology Centre in the summer and early fall of 1985. At the same time a file box was created for each of the six lab stations. The number of six students for each lab was determined by a variety of technical and financial constraints. The file boxes contained student and teacher files, school files, and reference materials related to the Rutherford school jurisdiction and the Provincial government.

The first field test of the course was offered in the Winter Term of the 1985-86 school year, as Educational Administration 506, an umbrella course number often used for experimental courses in the department. The response of the students was enthusiastic. The course was offered in this paper, videotape, and telephone version a total of six times before December of 1989.

By 1987 it had become evident that the technology developed for the course had limitations which were problematic and which could be transcended. The six file boxes, for example, required checking after each lab to ensure the files were all present and in the prescribed order. Additionally, materials had to be added to or subtracted from each depending on which of the three in-basket exercises was being undertaken. The random access videotapes were not always accurate, for a variety of reasons, and the slow response times they were providing (up to 30 seconds) were seen to be interfering with the fidelity of the simulation and working against student involvement in the activity. As students could do several things at once, and the video materials were not as imposing as the presence of a real person, students were often observed to be reading files and only listening to the videotape, thus missing relevant visual information in some cases.

Course Design Concepts

The design developed for the principalship course is not based in a behaviourist tradition of many defined measurable objectives as are so many technology based learning environments developed using instructional systems design. Rather, the design approach taken in this endeavour owes more to principles of cognitive psychology and instructional design techniques which have been called systemic (Richey, 1992, 1993; Beckwith, 1988) or, more recently, in a different theoretical context, constructivist (Jonassen, 1991; Duffy & Jonassen, 1991; Cole, 1992).

The goals of the course presented to the students state that at the conclusion of the course the student should have developed:

1. a better understanding of the ways in which you can think about and solve practical administrative problems in the light of administrative thought;
2. a more clear appraisal of the importance of school culture as a factor influencing school effectiveness, and a more clearly thought out personal vision for your school;
3. a more advanced formulation of your views of school leadership, in terms of your personal strengths and values, on the one hand, and relevant writing and research. (The Pembina Elementary School Simulation Student Handbook, 1993, p. 2)

The intention of the course designers has been to use the simulation incidents to develop a problem solving capacity in students which transcends the solutions to the "presenting" problems in the work sessions. Usually more than one of these "presenting" problems informs an understanding of a broader, deeper problem, an *appreciation* of the problem as Vickers (1965) describes it. These larger problems are those that must be dealt with by resolving more than their symptoms and in weaving the cultural fabric of the school. This leads directly towards clarifying a vision for a school, seeing it in terms of the "larger picture" at present, and subsequently working towards the vision.

The development of enhanced problem analysis capabilities is one of the areas of learning previously described as "resistant to classroom-based studies" which simulations should address. Observations of students in various sections of the course would also suggest that there are three of the other resistant areas of learning on which simulation methods have an effect. These are the assessment of 'personal fit' with the administrative role, an understanding of the personal demands of the role, and the management and human relations skills necessary.

As one consequence of this approach the instructor is substantially involved in a subjective assessment of the students' progress and the students themselves undertake considerable self-assessment as a form of reflective practise and the development of metacognitive skills related to administrative problem solving.

Student evaluation data obtained from the earliest offerings of the course suggested that the students were very pleased with the course overall and believed they were learning a great deal. What was not obvious, aside from the intuitive sense of the instructors/developers, was exactly what they were learning and how that learning might be described.

Student Response to the Initial Version

Between 1985 - 86 when the very first section of the course was offered, and the fall of 1988 the development team monitored the reaction of students to the simulation materials and to the course. The primary instrument for this monitoring was a short questionnaire which students were asked to complete at the end of each session. The questionnaire was seen as a formative evaluation tool, so versions of it varied slightly from term to term, although a high percentage of the questions were asked each time. A copy of the final form of this questionnaire is included as appendix B. In addition, the instructors and developers worked together to team teach the course in most instances, monitoring student activity and watching for problems with the simulation materials.

From the outset it was clear that even in this most simple form, students were responding very well to the simulation. In the first offering of the course in the Winter term of 1985-86, student response to the statement, 'Overall, this was an excellent course', was taken on a five point Likert scale, with five being a 'strongly agree' position. The mean student response was 4.9, in a range of 4 to 5. Between this time and the Fall term of 1988 the course was given four additional times and the mean response to this item continued to be 4.9, with a range of 4.8 to 5.0, over the four offerings.

Similarly, the question, 'Overall, the simulation labs were well prepared', and 'Overall, the simulation labs were very relevant to course goals', received mean ratings of 4.9 and 4. 8 over the four course offerings.

The debriefing seminars were seen slightly less favourably at this time, with a mean of 4.2, in a range of 4.1 to 4.4, being obtained in response to the statement, 'Overall, the seminars following up lab sessions were conducted in a way designed to help students learn the most from their laboratory activities.' This somewhat less enthusiastic response to the debriefing seminars may have related to instructors' decisions to allow student interest in a particular topic or item to guide the length of time the discussion went on. As one student expressed it in the comments section, the class "often got 'bogged-down' discussing items from in-baskets" and the proceedings "need some more efficient method of discussion." Other students echoed this feeling, some expressing a desire to make sure all items were discussed in the large group, some wanting small group debriefings, and some expressing frustration that they didn't get a chance to express their thoughts. Other students wanted more direct, personal feedback on the responses they had made. Given all of this, in the section of the form which asked for those elements of the course they liked best students repeatedly listed the combination of the simulations followed by the debriefing seminars as one of their preferred items.

In other areas related to creating a link between theory and practice, and problem solving, students were less certain in their Likert scale ratings, but enthusiastic in their comments. For the statement, "I learned to apply concepts/principles to management situations in this course", students responses had a mean of 4.3, in a range of 4.0 to 4.6. The related statement, "I developed skill needed by professionals in this field", gleaned responses with a mean of 4.15, and a range of 3.7 to 4.6. The statement related directly to problem solving, "I developed the ability to solve real problems in this field", student responses provided a mean of 4.13, from a range of 3.6 to 4.6. As indicated, however, student comments were quite enthusiastic about the 'practical' and 'real life' aspects of this learning opportunity. For example, one student wrote that one of the two things best liked was the "opportunity to make decisions on 'real-life' materials and then discussion with others about those decisions." Two others, among many, wrote, "The emphasis on the practical was very refreshing and the downplaying of theory in favour of practical experience", and "The very practical nature of the course".

In responding to questions about the problems and their validity for principals students confirmed that they saw these problems as being very relevant. To the statement, "The range of problems in the in-baskets seemed to represent the range and difficulty of problems dealt with by principals" student responses had a mean of 4.43, in a range of 3.9 to 4.6. The statement, "The problems in the in-baskets were interesting and stimulating" drew ratings with a mean of 4.68, in a range of 4.4 to 5.0.

Queries about specific elements of the simulations materials also drew enthusiastic responses. The most enthusiastic responses were for the telephone portion of the simulations, in which various parents, members of the community, or other administrators in the school district called the new principal. In response to the statement, "The telephone calls in the labs were a valuable part of my learning in this course", there was a mean of 4.85 for the responses, with a range of 4.7 to 5.0. Student comments were similarly enthusiastic. There were three questions asked about the video portions of the simulations, which were presented using random access videotape. A mean of 4.8, in a range of 4.7 to 4.9 was found for the statement, "The presentation of in-basket items on videotape in this course were interesting and stimulating." To the statement, "The pre-lab briefings and memory flash videotapes in this course were interesting and stimulating", the responses had a mean of 4.7 in a range of 4.5 to 4.8. To the last statement, "The orientation videotapes in this course were interesting and stimulating", students responded with ratings that had a mean of 4.4 and a range of 4.1 to 4.6.

Student comments in seminars and discussions, and the ratings and comments on the questionnaire were very encouraging. There were also some more negative aspects to the course. Students' comments in the first offerings of the course were quite sceptical about the value of a summative essay assignment which they were asked to undertake. As the course progressed, this was shifted to a reflective journalling assignment which has been much more readily accepted by students. There were also some changes undertaken in the balance between de-briefing seminars and tutorials to address student concerns about the amount of discussion time. Towards the end of the use of the videotape and paper files version of the course, a peer debriefing approach was introduced for a small portion of the total debriefing. This was also well received by students.

Some other problems which the team experienced with this version of the course were not so tractable. These problems were described earlier. The accuracy of the random access videotape searches persisted. Further, keeping the file boxes up to date and organized, and keeping the items in the problem envelopes complete and in order, were very time consuming and could not be done quickly and accurately by inexperienced clerical personnel. Finding an efficient solution to these technical difficulties and housekeeping tasks and improving the simulation exercises themselves prompted the developers and instructors to contemplate moving to a computer-based interactive video environment which would permit both of these advances.

Evolution to the Initial Interactive Version

The Instructional Technology Centre had by this time developed and produced several interactive videodisc materials for other departments in the Faculty, and some examples of management simulations produced elsewhere were also available for examination. After reviewing these materials and discussing the advantages of this approach a decision was taken to develop a revised version of the simulation materials using computer based interactive video technology and employing the IBM Infowindows system (see Figure 2.1).

Throughout the Fall of 1988 and during 1989 the materials were enhanced and modified for conversion to the computer based interactive video format. New scripts were developed for the orientation materials reflecting the comments of students in the earlier course sections, and the perceptions of the team for ways that additional information would be useful. An approach to an electronic office for the principal was devised. Other new features of the system included a video introduction to the teaching techniques, personalities, and social interactions of each member of Pembina's staff; the integration of all simulation elements onto a single screen; the establishment of interruptive

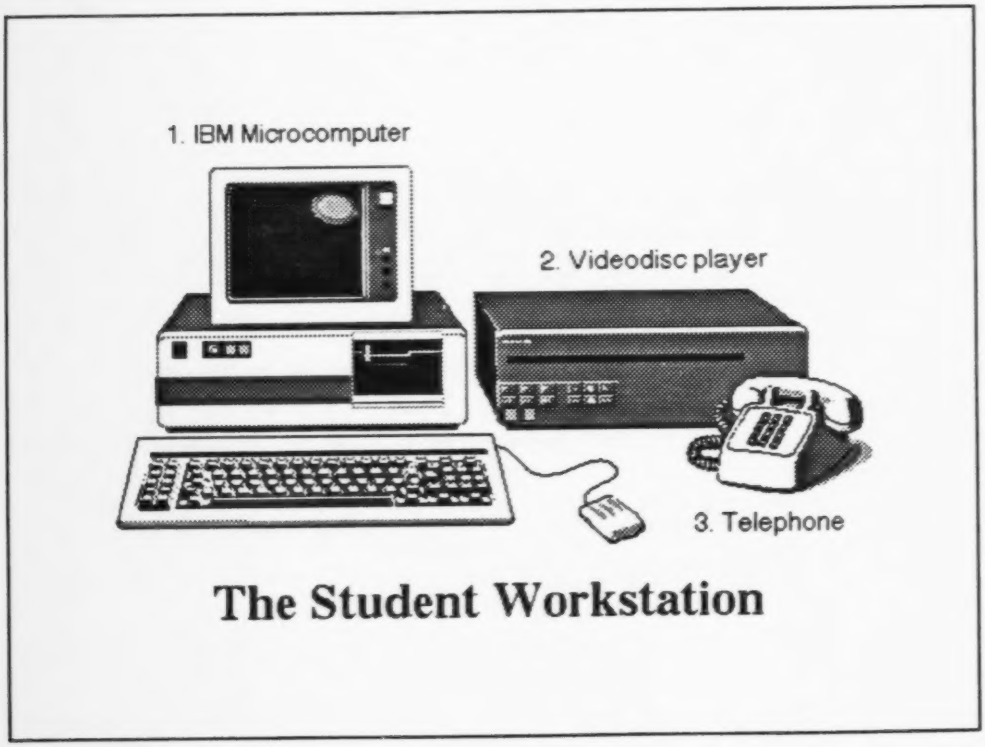


Figure 2.1

crises which were truly interruptive; the expansion of these interruptive crises into a series of alternatives which demand immediate action by the students; and on-line searching of the policy manual and other references.

The revised version of the course was first offered in the Winter term of the 1989-90 session. A few difficulties were experienced, and some resistance to working in the computerized environment was also encountered with one or two students. The strengths of the revised approach became apparent during this first field test and work proceeded to make the few revisions suggested by observation and by student feedback. The course was offered again in the computer based interactive video form in the summer of 1990 when Dr. Ken Ward rejoined the team. The course has subsequently been offered in eight additional terms; Winter 1991, Summer 1991, Winter 1992, Summer 1992, Winter 1993, Summer 1993, Summer 1994, and Summer 1995.

In each term one or two students were reluctant users of the computerized environment. It was necessary to coach these students through their reluctance. To accomplish this the instructor would normally talk with the students outside class time, and during the laboratory experiences the instructor would be sensitive to the needs of these students, checking on them more often than on the other students, helping as necessary. The perceived incidence of this mild computer phobia is seen to be gradually decreasing. An additional difficulty for some students has been the a lack of keyboarding skills which made it extremely difficult for them to work efficiently through the volume of problems in the simulations. This has been seen to be something of a barrier to learning for these students.

Work is continuing to improve the existing simulations and the related course design. A new project has been undertaken to produce a Junior High School simulation for use in a similar course using the same techniques.

Chapter 3

Review of the Literature

The research described in this study, dealing as it does with learning and the effectiveness of simulations in professional preparation programs, encompasses a number of knowledge areas. Initially, knowledge related to the utility of clinical work as a part of professional education, and in particular the preparation of educational administrators provides an important base. From here one moves on to the possibility of replacing an on-site experience with a simulation and the likelihood of a useful learning experience resulting from this. Finally, if a simulation is to be used, what factors should influence the design of the materials and the experience to ensure effectiveness? These intertwined areas of knowledge have been grouped and will be discussed under three general headings: clinical work in professional preparation programs; learning from simulation experiences; and design questions which may influence simulation effectiveness.

Clinical Work in Professional Preparation Programs

The role of clinical experience in professional preparation programs may be thought of, quite naturally, as falling under three headings: the current state of graduate programs in educational administration; the utility of a clinical experience component in graduate education; and methods of establishing a link between academic preparation and professional experience.

The current state of graduate programs for educational administration. There exists in educational administration programs, as described in recent literature, an uncertainty about the goals these programs can reasonably be expected to achieve

(Achilles, 1988; Miklos, 1984; Foster, 1986; Wendel & Bryant, 1988). In the first instance there is the differentiation between preparing people to be administrators, and preparing people to study administration. Those writers who agree that graduate programs make an important contribution to the preparation of a practising administrator do not necessarily agree on the best method. One group suggests the best method would be to prepare adaptive, thoughtful, problem solving persons by educating them broadly. Alternatively, another group suggests preparing a person specifically to perform in a role, possibly through careful attention to the specific skills and competencies necessary to fill an administrative role. Writers who advocate this latter approach have raised further questions about the degree of possible transfer of learning when a person who has been prepared to fill one type of administrative role is asked to fill another. In other words, if people are being prepared to fill the role of an elementary school principal, must they take another program to become a school superintendent or a secondary school principal?

Supporters of both groups seem to think general theoretical knowledge about various aspects of administration, such as law, economics, finance, sociology, and organizational development, is useful. There has been, however, debate over the place of theory in administrator programs, and existing programs are clearly criticized for being too theoretical (Manasse, 1985; National Commission on Excellence, 1987; McIntosh et al., 1988). There is general agreement amongst these writers that any theory which is deemed appropriate should be related to practice in some way. How this is to be done is the question. Should it be through field placements, internship, collaborative apprenticeship/study programs between universities and school boards or some other mechanism? What should be the emphasis in such programs, and can they provide sufficient breadth of experience?

Another criticism levelled at existing graduate programs has been the over reliance on traditional instructional methods (Manasse, 1985; National Commission, 1987; Wendel & Bryant, 1988). Although a few writers, such as Wendel and Sybouts (1988), have maintained that there is a broad range of instructional methods in use now, most writers do not seem to agree.

The utility of a clinical experience component in graduate education. Most writers examining the future directions of administrator preparation do, however, share a perception that some sort of clinical experience is necessary (Griffiths, Stout & Forsyth, 1988; Milstein, 1993; Murphy, 1993; Ratsoy, Richards, Haughey & Maynes, 1992; Wendel & Bryant, 1988). For the most part this experience is seen to be achievable through internships, apprenticeships, or some sort of clinical practicum. What is not as clear is what is to be achieved in a clinical experience, nor even how administrative expertise would necessarily develop as a result of such an experience. Central to this issue, once again, is whether a graduate preparation program should seek to prepare a person in general problem solving abilities, or train for specific role performance.

Methods of establishing a link between theory and practice. Examining what can be achieved in a graduate program and how administrative expertise might be developed through graduate education relates to the more general understanding of how an ability to perform any professional task is learned, and how a high level of competence is achieved. Schön (1983, 1987) has discussed ideas of reflection-in-action, and knowledge-in-practice with regard to this, and has clearly indicated that it is the preparation of the educated person which leads to high quality role performance. Schön does, however, inextricably link that role performance to an ability to think about what one does in a manner appropriate to the context. The ability of a person to think about their thinking processes, their metacognitive ability, and the usefulness of a mentor seem key in this instance.

In a similar way, Benner (1984) described the evolution of nursing competence in five stages from novice to expert, using a model derived from Dreyfus (1980). The Benner/Dreyfus approach asserts that development as a highly skilled worker is dependent on work experience to develop the subtle understandings necessary for expert performance and presumes little additional training or education to assist in this process. They assert that it is breadth of experience which leads to the intuitive understandings and predictions which permit 'expert' practitioners to act correctly in advance of any instruments recording data which would indicate the need for the action the experts take. Their findings are supported by work on the processes of expert problem solving being undertaken in the study of cognitive psychology (e.g. Voss, 1989; Larkin, 1989; Polson & Jeffries, 1982).

Kolb (1984) has discussed an approach to what he calls experiential learning in which the personal goals of an individual interact with work experiences and their academic learning in a holistic approach to personal development (Figure 3.1). Kolb describes it this way:

> The experiential learning model pursues a framework for examining and strengthening the critical linkages among education, work, and personal development. It offers a system of competencies for describing job demands and corresponding educational objectives and emphasizes the critical linkages that can be developed between the classroom and the "real world" with experiential learning methods. It pictures the workplace as a learning environment that can enhance and supplement formal education and can foster personal development through meaningful work and career-development opportunities. And it stresses the role of formal education in lifelong learning and the development of individuals to their full potential as citizens, family members, and human beings. (p. 4)

As a theory of learning Kolb does not see experiential learning as:

> a third alternative to behavioural and cognitive learning theories, but rather to suggest through experiential learning theory a holistic integrative perspective on learning that combines experience, perception, cognition and behavior. (p. 21)

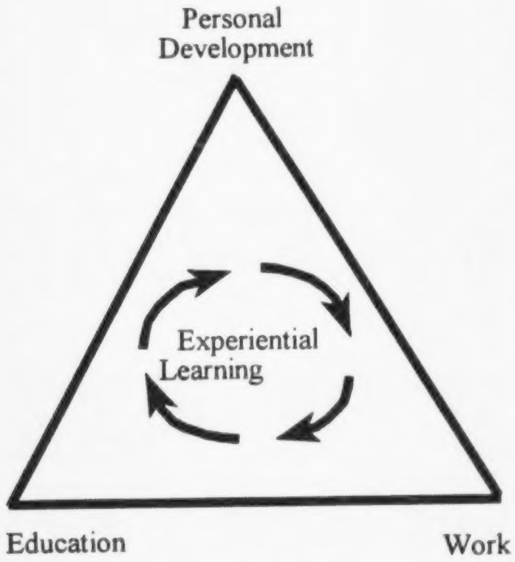


Figure 3.1.
Kolb's model of experiential learning

He based much of his approach on previous work by John Dewey, Kurt Lewin, and Jean Piaget. It involves a sequence of personal hypothesis creation as a result of work-related experience, the testing of that personal hypothesis, reevaluation, and the creation of new personal hypotheses. This is very like the ideas of reflection-in-action of Schön, and of subtle skill development of Benner and Dreyfus. Indeed, it was Kolb's ideas of experiential learning which formed the initial basis for much of the development team's ideas of how the simulation might be conceived and how the learning experience might unfold. While Kolb presents learning models from all three of Dewey, Lewin, and Piaget it was the Lewinian model of experiential learning (Figure 3.2) which the development team has used with students to present a basic approach to an ongoing iterative learning process. The basic Lewinian process concept which Kolb (1984) described seemed to contain in simple form the essential concept for the experience:

> Immediate concrete experience is the basis for observations and reflection. These observations are assimilated into a "theory" from which new implications for action can be deduced. These implications or hypotheses then serve as guides in acting to create new experiences. (p. 7)

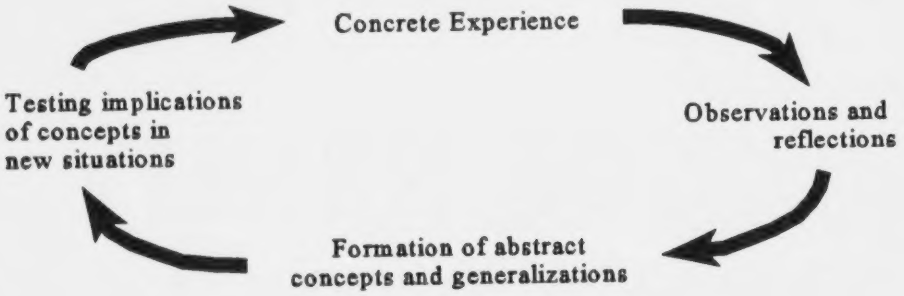

Concrete Experience
Observations and reflections
Formation of abstract concepts and generalizations
Testing implications of concepts in new situations

Figure 3.2.
The Lewinian experiential learning model

This development of 'theory' was interpreted by the course developers to be an individual, personal process. While they might choose to offer their formulations during seminars and discussions, there would be no pressure to do so.

If the development of a professional may be aided by participation in a graduate school experience, and in particular, one that affords some elements of work (or clinical) experience, it would seem useful to look beyond the ideas of work experience or clinical experience to consider simulation. LeVan and Carley (1984) have demonstrated that the work experience component of the Kolb model can be replaced by a simulation component. Observations based on previous work in Project Decide would reinforce this. Some elements of a simulation, namely the exercise of responsibility, the personal safety of the participants, the compression of time, and the uniformity of experience for all participants, have definite implications for the development of excellent applied experiences in a graduate education program. Although a simulation is less real than an internship, apprenticeship, or practicum, research on simulations in many skill areas has indicated that this lessening of realism, sometimes called the *fidelity* of the simulation, does not detract from and may be argued to enhance learning. It is not argued that simulations might totally replace other forms of experience in the development of a professional. Alessi (1988) has discussed the point past which simulations do not make sense in the development of skills. In his view this is related to the initial skill of the student. He postulates that inexperienced students learn more of what they need to know, and learn it faster, in simulations than a highly skilled student. Given the variable levels of professional skill and involvement brought to graduate education programs by the students enrolled in them, this factor needs to be examined. Table 3.1 provides a comparison of some features of an internship, a reflective practicum, and an experiential

Table 3.1:
Preparing for Professional Practice: Three Instructional Modes

	Internship	Reflective Practicum	Experiential Simulation
Brief Description	assignment to an organizational role with specified responsibilities over an extended period of time	assignment to a mentor-administrator, "shadowing," interviewing, and some assigned responsibilities	simulated performance of full range of administrative responsibilities
Breadth of Experience	***	**	***
Exercise of Responsibility	*	*	**
Completeness of Interactions	***	***	*
Feedback/dialogue on performance (support for reflection)	**	**	**
Major Drawbacks	limitations in delegating key aspects of principal's responsibilities	very limited exercise of responsibility	difficulty in creating full verisimilitude
Nature of Collaboration	creation of internship positions; joint supervision	selection and preparation of mentors; released time for trainees	collaboration in developing instructional materials and procedures

Key to ratings: excellent ***; good **; fair *.

simulation, confirming that simulations may offer substantive learning opportunities.

Having reviewed aspects of clinical work in administrator preparation programs and established a desired basis for simulations as clinical experiences in a graduate program, we will now consider questions related to learning from simulations.

Learning from Simulation Experiences

The work in this study addresses questions related to the effectiveness of simulations for learning generally and, specifically, for learning the complex skills at issue when an educational administrator seeks to build connections between academic learning and professional practice which is personally relevant and useful. Addressing these questions involves principles of learning psychology. In this instance constructivist principles from cognitive psychology are used as the basis for understanding and interpreting the learning and use of complex skills. The review of the related literature in this area will deal first with the theoretical basis for simulations, learning within a cognitive and constructivist psychological frame, the importance of situated cognition, ideas on solving ill-structured problems, and finally, from a more technical orientation, research on learning from interactive video.

The theoretical basis for simulations. Simulations have been accepted as an effective approach to learning for over four decades (Dittrich, 1977; Romiszowski, 1981; Millar, 1984; Alessi & Trollip, 1985), even though human interaction simulations involving video and computer combinations have only been developed within the past decade. Simulations can vary in their design and intent and several authors have provided typologies for classifying these variations (e.g. Alessi, 1988; Alessi & Trollip, 1985; LeBow & Wager, 1994). Alessi (1988) describes a system of classification with four types: physical, process, procedural, and situational. The Project Decide simulations fit within the situational group which is described by Alessi as follows: "In situational simulations the student learns about working within a social system, such as running a business or teaching in a high school" (1988, p. 43).

It is also crucial to note that learning from simulations, particularly situational simulations, is not simply dependent on the simulation experience itself. Reflection on the experience and open discussion of the problems and solutions in debriefing seminars are essential ingredients in a successful simulation learning experience (Ellington, 1987; Lederman, 1984; Romiszowski & Grabowski, 1989).

The advantages simulations can offer in a learning environment have been described by a number of writers:

1. Simulations can be a motivating element for students (Alessi & Trollip, 1985; Buckley & Marovitz, 1989).
2. Simulations can aid in the transfer of learning from a cognitive/theoretical framework to a real environment (Alessi & Trollip, 1985).
3. The efficiency of initial learning and the transfer of learning may be enhanced through the use of simulations. Time wasting through superfluous or irrelevant activities can be reduced, thus controlling the distracting cues with which the learner must deal. The cost of creating a simulation is also a factor in creating an efficient simulation environment (LeVan & Carley, 1984; Alessi & Trollip, 1985; Reigeluth & Schwartz,

1989).

4. The ability to collapse the time between events in a simulation can be very useful in enhancing learning (Harper, 1980, cited in Millar, 1984).

5. The personal safety of a learner may also be assured in a simulated situation (Hannafin & Peck, 1988).

This list of potential advantages of simulations seems to have direct relevance for some of the problems to be dealt with in establishing `clinical' education experiences for students of educational administration which will permit them to establish connections between theory and practice. The basis on which such connections might be learned has been linked to the work of Kolb (1984), as we have seen, but aspects of understanding learning from a cognitive and constructivist psychological viewpoint have also been important.

Learning within a cognitive and constructivist psychological frame. To be able to recognize and deal with many of the organizational and social problems beyond the straightforward ones brought to her or his door, the principal must be aware of the nuances of behaviour, values, knowledge and interaction among the teachers, pupils, support staff, central office staff, and community members who comprise the school and its immediate environment. Perceptual sensitivity and subtlety are needed to discern much of this, and it is related directly to a realization of whether or not a problem exists. In describing the complex learning which must be undertaken to understand the complexities of school cultures and school environments, and in developing the kind of problem solving skills necessary for an effective school administrator, the more traditional behaviourist approaches to prescribing instructional events in terms of objectives, and stating the basis for evaluation in observable outcomes, are seen to be very deficient. Portions of the work describing a cognitive psychological framework for understanding how people think, how they learn, and how they solve problems provides a much more satisfactory framework for discussing the complex learning in an experiential simulation course. Glaser (1991) provided an essential link between cognitive psychology and education and learning by stating:

> The recurring theme is that learning is a process of constructing new knowledge on the basis of current knowledge. The pervasiveness of this theme in cognitive science is evident in the concepts of: (a) the representation and organization of knowledge; (b) self-regulation, metacognition, or what can be called second-order knowing; and (c) the social and situational nature of learning. (p. 132)

> Similarly, Resnick (1989) maintained that:

> current cognitive theory emphasizes three interrelated aspects of learning that, together, call for forms of instructional theory very different from those that grew out of earlier associationist and behaviourist psychologies. First, learning is a process of knowledge construction, not of knowledge recording or absorption. Second, learning is knowledge dependent; people use current knowledge to construct new knowledge. Third, learning is highly tuned to the situation in which it takes place. (p. 1)

From such work linking education to theories of cognitive psychology one can extrapolate and focus on those elements of cognitive psychological processes which should be addressed in learning to solve ill-structured problems and subsequently transferring that learning to solve similar problems in a professional work setting. Four elements seem particularly important: (a) the acquisition, construction, and representation of new knowledge; (b) the role of previous knowledge; (c) metacognition and self-regulation in learning; and (d) the social and situational nature of learning.

The acquisition, construction and representation of new knowledge. While questions of how we acquire knowledge, how that knowledge is represented in our minds, and how we use that knowledge are questions which have been explored since the time of Plato and Aristotle, the most widely accepted and widely discussed approach to these questions in modern psychology is schema theory. It has been proposed that schema, and their singular form schemata, are the "data structures for representing the generic concepts stored in memory. They exist as generalized concepts underlying objects, situations, events, sequences of events, actions, and sequences of actions" (Rumelhart & Ortony, 1977, p. 101). Spiro (1977) adds that they are "cumulative, holistic, assimilative blends of information" (p. 137). Rumelhart (1980) further explores the multidimensional nature of the construct of schema by providing four co-existing analogies for them. Schemas are simultaneously or separately like plays, theories, procedures, and parsers.

Although the precise nature of the structures of knowledge is not, and probably cannot, be known in anything other than a speculative theoretical way, it seems clear that those structures are critically important for learning. Glaser (1991) recognized this and summarized the implications:

> Extensive research and theory on human problem solving shows that the way students represent the information given in a math or science problem, or in a text that they read, depends upon the structure of their existing knowledge. These structures enable them to build a representation or mental model that guides problem solution and further learning. As learning occurs, increasingly well-structured and qualitatively different organizations of knowledge develop, and these

> allow competent individuals to avoid disconnected trial-and-error and to make inferences and analogies that readily result in new learning and effective problem solving (p. 132)

The role of previous knowledge. Yates and Chandler (1991) asserted the importance of prior knowledge for learning in an article surveying the implications of research in the cognitive psychology of knowledge for education:

> The assertion that learning is influenced by what a person already knows is perhaps unsurprising. What is surprising, however, is the power of this effect. Once a learner's attention is secured, the impact of existing knowledge on learning will often outweigh factors such as incentive, cognitive style, locus of control, personality or attribution dispositions. (p. 141)

Yates and Chandler (1991), Bransford, Vye, Adams, and Perfetto (1989), and Glaser (1991) all reviewed significant volumes of research which support the idea that prior knowledge is very important in learning and in problem solving. That research also lends a good deal of strength to those theoretical elements of cognitive psychology which argue the importance of prior learning as well (Feuerstein, Jensen, Hoffman, & Rand, 1985; Glaser, 1991; Rumelhart, 1980; Rumelhart & Ortony, 1977; Voss, 1989). The very term constructivism, which is used so extensively now, implies ongoing building on the foundation of what is already known. This is an important aspect of the preparation of school administrators, given the previous level of knowledge of schools and school districts which nearly all interested candidates possess.

Bransford et al. (1989) also addressed several intriguing problems with regard to the use of prior knowledge in learning and problem solving, which also seem directly relevant to the work of students in administrative simulations. These include the problem of activating and accessing inert knowledge; the failure to understand new facts; the problem of overly contextualized knowledge; and inefficiency of access. Other problems have been identified by Yates and Chandler (1991) including three types of interference effects, where prior knowledge can interfere with new learning. The three sorts of interference are memory interference effects, misconception effects, and know-it-all effects. Misconception effects, where the learner builds subsequent learning on a base which is faulty because of misunderstanding concepts or an acceptance of misinformation, seems particularly important in educational environments.

Metacognition and self-regulation in learning. Flavell (1976) provided this definition:

> Metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g., the learning-relevant properties of information or data. For example, I am engaging in metacognition (metamemory, metalearning, metaattention, metalanguage, or whatever) if I should notice that I am having more trouble learning A than B; if it strikes me that I should double-check C before accepting it as a fact; if it occurs to me that I had better scrutinize each and every alternative in any multiple-choice type task situation before deciding on the best one.... Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective. (cited in Brown, 1980, p. 454)

Much of what is depicted here would seem very relevant to the work of a principal, at the school or in a simulation. At a surface level it would seem important to try to develop the kind of self-awareness which Flavell describes. But do adults working on professional problems in the rush and turmoil of day to day life pause to reflect on the utility of using a strategy of some sort in approaching a problem, or do they suppress those elements of thought in favour of speed and experiential knowledge? In considering the role of prior knowledge Yates and Chandler (1991) and Bransford et al. (1989) illustrated that expert problem solvers tend to rely less on general problem solving models and more on both their experience in seeing new problems as reformulations of old ones and to see these problems in deeper ways, to improve their problem solving effectiveness. Does this also induce a certain percentage of failure by reducing the perceived importance of a more strategic or metacognitive approach? By becoming enculturated into a complex social structure do professionals cease to be able to think broadly or laterally outside of that social structure? Polson and Jeffries (1985) offered this perspective on the importance of metacognition in problem-solving:

> In information-processing research, metacognitive knowledge plays an important role in problem solving success. It has been suggested that the importance of this kind of knowledge be communicated to students to enable them more effectively to monitor their learning and problem-solving behaviour. (p. 424)

How this might influence the effectiveness of work and subsequent learning in a principalship simulation, and indeed in later work as a school administrator, deserves some scrutiny.

The importance of situated cognition. There has been increasing attention paid to the social situation of knowledge, a seemingly fundamental aspect of human learning and human performance which has not previously been given the centrality it deserves, especially in earlier behaviourist approaches to psychology. However, cognitive psychologists today are becoming categorical in their statements of social and cultural elements as essential for understanding the minds of humans. Glaser (1991) states that "cognitive activity in school and outside is separable from its cultural milieu" (p. 134). Extending this, Resnick (1989) proclaims "it is already clear that investigations of situated learning will play an important role as cognitive instructional theory continues to develop" (p. 14). Feuerstein et al. (1985) argue that:

> Regardless of the differences among cultures in their conventions, customs, beliefs, rules, perspectives, outlooks, mores, and traditions, the fact that all cultures possess some form of these implies that a complex set of motives, representations, and meanings exists within the bearers of each culture, animating their interaction with their progeny. (p. 51)

Also of note in this regard is the discussion which has been undertaken in educational circles in recent years under the heading *situated cognition* or *situated learning* (Brown, Collins, & Duguid, 1989; Brown & Duguid, 1993; Choi & Hannafin, 1995; Lave & Wenger, 1991). In these discussions there are three elements which may be worth noting with regard to the simulation learning environments of interest in this study. The first is the importance of focussing on learning rather than teaching (Lave, 1991; Brown & Duguid, 1993) and the related idea that learners, particularly professional learners seeking to improve their knowledge and skills, will take with them from any learning experience those things which make sense to them, not necessarily to the teacher. Secondly, Lave (1991) has noted that a situation is much more than the immediate physical surrounding. In the context we are interested in, a situation includes both social and historical dimensions as well. These social and historical dimensions include the learner functioning within the actual or simulated environment and it is this which makes the third element, cognitive apprenticeship (Brown, Collins, & Duguid, 1989), possible. Cognitive apprenticeship may be conceived as trying to "enculturate students into authentic practices through activity and social interaction in a way similar to that evident -- and evidently successful in craft apprenticeship" (p. 37). Brown, Collins, and Duguid go on to say that such apprenticeship "supports learning in a domain by enabling students to acquire, develop, and use cognitive tools in authentic domain activity" (p. 39). Tools in this context also have a special meaning:

> Conceptual tools similarly reflect the cumulative wisdom of the culture in which they are used and the insight and experience of individuals. Their meaning is not invariant, but a product of negotiation within the community. Again, appropriate use is not simply of the abstract concept alone. It is a function of the culture and the activities in which the concept has been developed. (p. 33)

Further, if student learning is a process of enculturation, then Brown et al. (1989) suggest a series of "salient features" (p. 40) of group learning which should occur in the seminars and tutorials of the simulation course. These features include collective problem solving, displaying multiple roles, confronting ineffective strategies and misconceptions, and nurturing collaborative work skills (Brown et al., 1989).

The current approach to the Project Decide simulations is rich with staff histories, school board policies, legislation, and other useful information. Reference to such materials is encouraged overtly by instructors before the simulations and covertly by the demands of the items in the in-baskets, but the extent to which it is meaningfully used by students may be questioned. Following Brown, it should be useful to examine the extent to which this information base is used by students, the extent to which it informs debriefing seminars, the extent to which they learn from it, and ways in which an adapted simulation design may be more effective in this regard.

In this context it is useful to alter the emphasis in the conclusions by Yates and Chandler (1989) and Bransford, et al. (1989) slightly to state that professionals increasingly use knowledge of the organizational culture in which they are placed and their experience within that environment, as the basis for improved understanding of the problem situation and for improved effectiveness as a problem solver. The relationship of knowledge of situation and the use of experience seem clear, and closely interrelated in the context with the role of prior knowledge in learning.

Solving ill-structured problems. Problem solving may be seen, as has been previously described, as one extremely important aspect of the learning a student does in an instructional simulation. Most of the problems which confront a school principal in his or her work life tend to fall into the category generally referred to by cognitive psychologists as ill-structured. They are designated ill-structured in comparison to domains of knowledge where the problems presented are well structured, such as mathematical problem solving, or puzzles testing more general thinking skills such as the Tower of Hanoi (Kotovsky & Fallside, 1989; Mayer, 1983; Polson & Jeffries, 1985, 1982), or river crossing problems (Mayer, 1983; Polson & Jeffries, 1985, 1982). Spiro, Feltovich, Jacobson, and Coulson (1991) characterized an ill structured problem domain as one where both of the following properties hold:

> (1) each case or example of knowledge application typically involves the simultaneous interactive involvement of multiple, wide-application conceptual structures (multiple schemas, perspectives, organizational

> principles, and so on), each of which is individually complex; and (2) the pattern of conceptual incidence and interaction varies substantially across cases nominally of the same type (i.e., the domain involves across case *irregularity*). (p. 25)

Within this group Spiro et al. provide "medicine, history, and literary interpretation" (p. 26) as examples within a broad possible range. Cole (1992) suggests that these problems are characterized by the need to use advanced knowledge in their solution, and by divergent and far-transfer outcomes (p. 28) as distinct from the basic knowledge, convergent outcomes, and near-transfer outcomes which characterize well structured domains. Discussions of problem solving approaches and learning problem solving involve careful consideration of a number of mental processes related to memory, prior knowledge, the context, and consciousness of the problem solving process.

In recent psychological studies of problem solving (Bransford, Vye, Perfetto, & Adams, 1989; Glaser, 1991) there has also been a trend to propose that expert problem solving is very different from generic problem solving procedures. The considerable body of work demonstrating the importance of domain-specific knowledge and practice in developing professional problem solving expertise (Bransford et al., 1989; Glaser, 1991; Spilich, Vesonder, Chiesi, & Voss, 1979; Voss, 1989) would seem to provide a better approach to the sort of ill-structured problem solving undertaken by professionals than would application of any of the many general thinking skills programs which have become reasonably well known (e.g. Bransford & Stein, 1984; Covington, 1985; de Bono, 1985; Lipman, 1985). Voss (1989) underscored the difference here when he stated that he did not mean to imply "the problem solver is solely at the mercy of domain-related knowledge. A person with minimal knowledge of a domain could possibly apply general problem solving strategies, but it is reasonable to ask what the use of such strategies may accomplish" (p. 276). Given the research to date it would seem more viable in the longer term to pursue the elements suggested by research into expert problem solving in seeking ideas useful in helping principals learn problem solving skills.

Beyond this there is also the question of whether there is any difference between an expert problem solver and an effective problem solver which might influence how problem solving is approached in the simulations and seminars.

Effective problem solving. Bransford et al. (1989) cited the advice given by Thorndike as being extremely important for improving thinking skills, and by extension problem solving: "Have students practice on tasks that are similar to those one wants them to perform later on" (p. 201). Researchers in cognitive psychology have identified a number of elements for making problem solving efficient and effective. Possibly the most important of these is to ensure a proper understanding of the problem. According to Larkin (1985), "powerful problem solving is impossible without understanding" (p. 157). She goes on to define understanding as "the processing of the original problem presentation to construct a meaningful internal representation that can be manipulated by the solver in order to produce the desired result" (p. 157). Polson and Jeffries (1985) cite three criteria for problem understanding which need to be achieved for efficient solution. These are: the representation of the problem must be coherent; the understanding which is constructed must "correctly describe the underlying structure of the task" (p. 423); and the representation which is constructed must "be well integrated with the remainder of the solver's world knowledge" (p. 423). Voss (1989) argued that "the need to develop a good problem representation is especially critical when the solver is confronted with unstructured problems" (p. 271). In this regard, he contended that if a good representation is not created, including the major components of the problems, "the solution has little chance of succeeding" (p. 272). Further, he maintained there is a strong affective component, that the "representational development is highly influenced by the individual's perception" (p. 272) of problem elements. Put another way, the values and biases a problem solver brings to a situation have a definite bearing on how that person understands or 'appreciates' the problem.

However important the initial understanding may be there are other important areas where the differences between good problem solvers and poor ones may be highlighted. Lochead (1985) suggested there are differences in four areas. Besides understanding the problem, he suggested good problem solvers excel at three other aspects of problem solution: understanding the ideas contained in the problem; their general approach to solving problems; and their attitude toward solving problems (p. 110). He further indicated that superior problem solving is an active process, claiming "poor problem solvers are less active because they do not believe there is anything for them to do" (p. 110).

Voss (1989) also suggested two things in addition to understanding the problem which he feels are critical to the development of problem solving expertise. The first is that the development of expert skill "especially found in complex subject matter domains, is a gradual process; there are no rules or short cuts that enable a person to become an effective problem solver" (p. 275). The second, as described in the preceding section, is that "more effective problem solving is related to the development of increasingly abstract knowledge structures" (p. 276). He also suggests that a "major characteristic of a good problem solver is flexibility" (p. 285).

Ultimately, it may be that the gradual development of expertise and the building of increasingly abstract knowledge should be the focus of discussion for enhancing the skills of principals in solving ill structured problems in the workplace. It is also important to remember that in his review of problem solving Voss (1989) concluded that "the various viewpoints demonstrated that problem solving cannot be considered apart from other psychological processes" (p. 255).

Finally, there is one more body of research to be considered regarding learning in the type of computer-videodisc environment used for this simulation -- the more instrumental area of media research on learning using interactive video systems. The theoretical basis for the design of simulation materials combining professional work problems with a complex information base, a combination which might be considered vicarious experiential learning, is very limited, as has been pointed out. The empirical evidence for the structuring of such a learning environment to ensure effectiveness is even more limited and the majority of applicable or related research is found in research on the effectiveness of interactive video.

Learning from interactive video. In reviewing the research on interactive video, Hannafin stated that "Little empirical research of any type has been published to either support the differential effectiveness, the effects on learning, or the validation of the basic assumptions, of interactive video" (1985, p. 236). Wilson (1988) supported this view in her review of the literature for the creation of interactive video learning environments for young children.

These views notwithstanding, in extensively reviewing the available research DeBloois (1988) was optimistic both about the amount of concept learning which occurs when interactive video learning systems are used and the rate at which it occurs. He cited several studies which indicate the positive shifts in attitude towards the content material developed on the part of students working on learning systems involving interactive video.

Having considered the usefulness and role of simulations in professional development and how they might influence the learning of administrative skills and problem solving, the last area of knowledge which is important in the creation and use of simulation learning experiences is related to techniques and considerations for the development of the simulation materials.

Design Questions Which May Influence Simulation Effectiveness

In preparing the materials to create a simulation environment one needs to consider techniques for developing both their design and their production. One of the most common approaches to developing instructional materials is that of instructional design, which will be examined first. Beyond the design stage there are specific production issues which are important in creating computerized simulation learning environments to provide the simulations with appropriately high levels of content validity and fidelity (Alessi, 1987; Millar, 1984; Mappin, McIntosh, & Maynes, 1989).

Instructional design techniques for the creation of simulation learning environments. For the past twenty years the majority of the published approaches to instructional design involve the use of linear models to move through the necessary stages from the analysis of the problem to the implementation of the learning system developed in response to the analysis. These models are very similar to one another, but none of them works particularly well with reference to the problems of developing computer based interactive video materials or simulation materials. The lock step, objectives oriented procedures are almost antithetical to the development of environments oriented to learning to solve ill-structured problems. Newer work in the use of cognitive psychology as a foundation for instructional design, an approach often referred to as the constructivist approach (Cole, 1992; Duffy & Jonassen, 1991; Jonassen, 1991), proposes new methods of design which are tied to statements of problems rather than to behavioural objectives (Spiro, Feltovich, Jacobsen, & Coulsen, 1991; Cognition and Technology Group at Vanderbilt, 1990). Seen to be more systemic than systematic (Beckwith, 1988), these new methods may yield improved ways to design simulation materials in the future.

Most of the currently published approaches to the design of simulations relate to the design of engineering or operating simulations, where the procedures for accomplishing something and the sequence in which the acts must be taken may be defined precisely (see for example, Alessi & Trollip, 1985; Alessi, 1987; Reigeluth & Schwartz, 1989). Within such designs the amount of possible variance from the established procedures, without a predictable negative consequence, is very limited.

One might have expected more from the tradition of simulations within business, but most of the writing here deals with descriptions of the simulations, and factors which affect their effectiveness. While useful, these do not provide much assistance in establishing a model for developing computer based interactive video simulations.

Reigeluth and Schwartz (1989), for example, have described a method of using elaboration theory to design a simulation. Their procedure, however, depends on the establishment of performance objectives and continued delimiting of tasks until each is reduced to its smallest components and can be dealt with within the system. This is not seen to be particularly relevant to the design of a simulation system where there is a fairly wide range of acceptable answers and where using attributes of the players and the environment to restructure and combine problems is seen to be a desirable approach.

Romiszowski and Grabowski (1989) have also described methods of using knowledge of cognitive structures to enhance the effectiveness of interactive simulations and games, but again there are no procedural descriptions to assist an inexperienced designer of such games.

In designing interactive simulations and discovery learning environments it is very important to use iterative methods which recognize the need to return to previous points in the design process as new factors and elements are uncovered, and incorporate them quickly into the design of the materials. The practice of instructional design has departed significantly from the published accounts of the procedures in recent years, particularly where the design of computer based interactive video materials is concerned. Newer thinking about the procedures necessary for instructional design and the development of concepts of rapid prototyping hold promise for revising both the published procedures for instructional design and the tools used to accomplish them.

Production design considerations for video and computer presentations in human interaction simulations. Production design considerations must also be taken into account. This must be done primarily in three areas:

1. The use of perceptual rather than filmic structures and transitions in the video sequences. This is particularly important in creating the illusion of involvement and participation on the part of the learner. Camera moves such as pans must be used to simulate eye movements, rather than cutting from one scene to another, so the learner feels psychologically comfortable. Emotional intensity of the incidents being portrayed must also be communicated by the closeness of the 'shot', and it must be akin to the emotional intensity the incident would normally inspire. A number of authors have dealt with aspects of this in the literature on television and film production techniques (see, for example, Millerson, 1972; Zettl, 1990, 1972).

2. The design of the interface between the learner and the computerized learning environment. The learner must be able to navigate within the system with some ease and confidence so the simulation activities become the primary focus rather than understanding the computerized environment. A considerable body of literature has been developed in this area which must be explored in the context of the needs of the Project Decide simulations (see, for example, Kearsley & Halley, 1985).

3. The design of the information screens to maximize understanding and assimilation of the information students find. The design of textual information for

learning both on the printed page and on a computer screen has also been developing (see, for example, Jonassen, 1982; Heines, 1984; Hooper & Hannafin, 1986).

Summary

The literature, then, provides a number of useful anchors for this research endeavour. It is clear that the presence of a clinical component in the preparation of educational administrators is seen to have value. Further, there are good reasons to believe that it may be possible to replace or augment many types of clinical activities with simulations. These simulations need to be built around the kind of ill-structured, context bound problems which administrators face, and the techniques for helping students learn to be expert problem solvers who are also very effective need to be put in place. When students learn from experiential simulations the effects can be very powerful, but the success of the simulations depends on the care with which they are designed. Standard instructional design procedures are not seen to be particularly relevant in designing simulations, but newer techniques for using rapid prototyping may be more useful. In producing the materials themselves care must be taken to create the desired perceptual effect with the video, and to ensure that the computer interface and information design is undertaken to optimize student understanding.

Chapter 4

The Pembina Elementary School Simulation Study

Overview

As outlined in the introductory chapter, this study was devised to explore the learning which students acquire in a graduate level course on the principalship which is centred around three simulations of a principal's work day using interactive computer-videodisc technology. A second purpose of the study was to develop an understanding of how the students learning was, and might be, influenced by the design of the simulation experience.

The specific research questions addressed in the study emerged from a project involving the development, implementation, and evaluation of specific simulation materials over a period of ten years. To restate them, the four specific questions which guided the inquiry were:

a. What can we discern about what students are learning in the simulation course based on the Pemina Elementary School simulation? What facilitates this learning? What gets in the way?

b. How well does the current design for the simulation materials, with its various electronic sources of information, assist students to establish a useful, ongoing linkage between knowledge obtained through academic preparation and knowledge obtained through the problems they face in professional practice? To what extent does this environment assist in developing their understanding of the administrative role?

c. How has the experience with the simulation course informed our current understanding of the process through which an administrator moves from an unskilled, or novice, position to that of a skilled, reflective practitioner? To what extent can this be related to activities which are possible within a graduate education program, especially those involving simulations?

d. Using the experiences with the Project Decide simulation materials and current relevant theoretical and scholarly writing, what advanced design might be crafted for a simulation/information environment for the training/education of administrators?

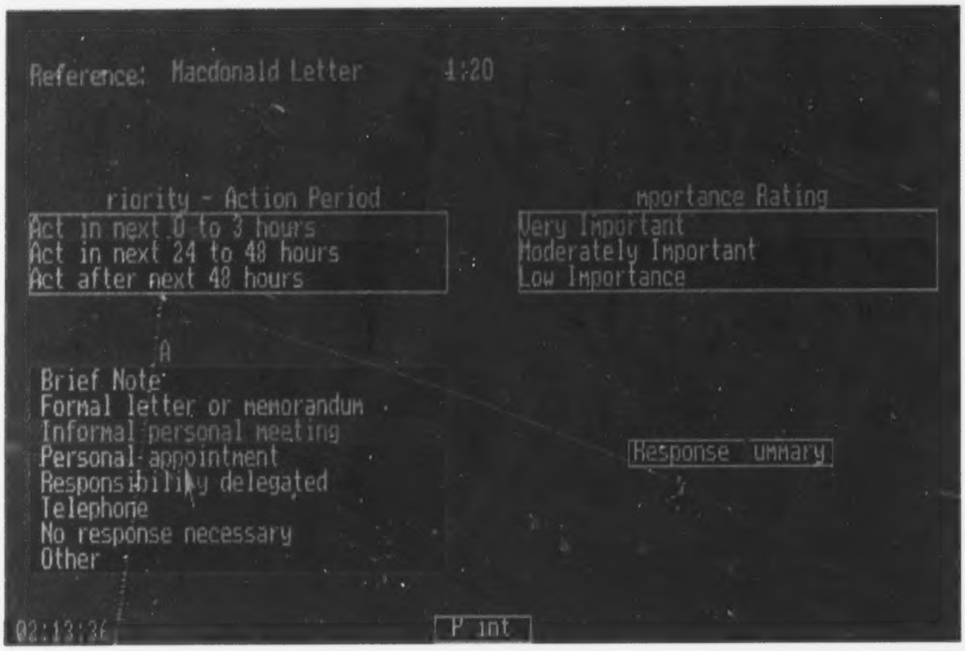
This chapter will describe the methodology for the study and provide some background for the choice of that methodology. First, some background to the choice of study methodology will be provided. Subsequent sections will deal with relevant aspects of qualitative research methodologies, the choice of a specific study design, a pilot study undertaken in 1990, the participants in the main study, standards of rigor aspired to in qualitative research, some comments on ethical considerations, and some limitations and delimitations of the study.

Study methodology

The legacy of the scholarly work in several disciplines reviewed by this researcher leads to an ontological understanding of a social world created in the minds of the individuals who inhabit it, with only indirect confirmation being possible through visible or empirically verifiable constructs established through intersubjective agreements. There remain ongoing differences between various schools of non-positivist approaches to research and considerable debate concerning the extent to which knowledge produced from competing ontologies may co-exist or inform other studies. Particularly strident voices in this debate belong to some who argue that knowledge produced using a positivist paradigm has been developed in a manner of knowing so foreign that it cannot be considered reliable or credible in the world of naturalistic social sciences (e.g., Guba & Lincoln, 1981; Lincoln & Guba, 1985).

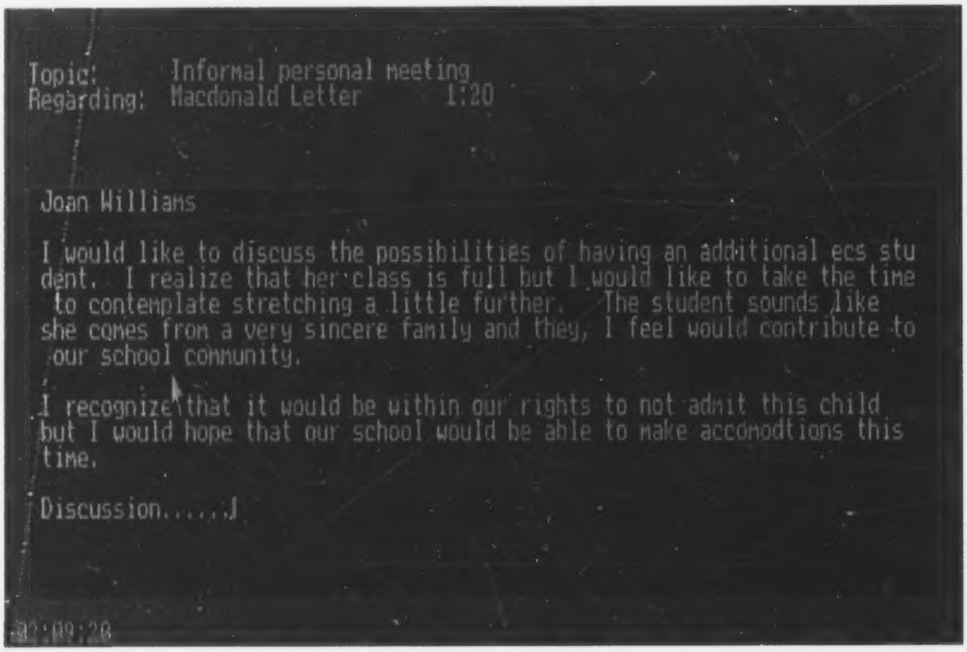
As can be inferred from the goals and processes for the course presented earlier, the learning experience being studied is grounded in ideas of individually constructed and interpreted social and organizational realities but checked against the realities of other course participants. This philosophical orientation also explicitly influenced the design of the responses to the simulation expected from students, the other course assignments, and the design of the seminar itself.

For each of the 24 or so problems presented during each simulation a student was expected to provide a response. The design of the response to each problem item was made open ended to allow students maximum flexibility in dealing with the complexities of each situation as they interpreted it. For each, even in the few items which interrupted the normal work flow and provided a structured series of plausible responses to every reaction, students were expected to assign their personal ratings of priority and importance to the items, and to provide a written response. The responses were made on a form presented to the student on the screen when they requested it. It appeared to them on two linked screens as illustrated in Figures 4.1 and 4.2. After the form was


Reference: Macdonald Letter 1:20

riority - Action Period
Act in next 0 to 3 hours
Act in next 24 to 48 hours
Act after next 48 hours
mportance Rating
Very Important
Moderately Important
Low Importance
A
Brief Note
Formal letter or memorandum
Informal personal meeting
Personal appointment
Responsibility delegated
Telephone
No response necessary
Other
Response ummary
02:13:36
P int

Figure 4.1. Response Record, Screen 1


Topic: Informal personal meeting
Regarding: Macdonald Letter 1:20

Joan Williams

I would like to discuss the possibilities of having an additional ecs student. I realize that her class is full but I would like to take the time to contemplate stretching a little further. The student sounds like she comes from a very sincere family and they, I feel would contribute to our school community.

I recognize that it would be within our rights to not admit this child but I would hope that our school would be able to make accomodtions this time.

Discussion.....J

Figure 4.2. Completed Student Response Record, Screen 2

completed it was printed out and given to the student for their use in the follow-up seminar activities. The ratings of priority and importance did not generate any computer ratings or comparison to a norm. Any critical adjustment of decisions was left for the student principal to undertake as the debriefing seminars unfolded.

Likewise, in course assignments students were encouraged to develop their own ideas of the principalship, administration, and school culture, in the context of their own values and experiences. Students were left to select their own readings from a book of readings for all excepting one or two articles considered key to the course goals. They were also asked to maintain a reflective journal describing their experiences in the simulations and the seminars. In these journals students were asked to explore their reactions to these experiences while trying to make sense of them within the context of administrative theory and their emerging vision of the school they would lead.

The debriefing seminars were kept as non-judgmental as possible. The instructors who have taught the course have all quite successfully avoided making negative judgments about the courses of action proposed by the students in the course, deftly steering discussion to the heart of complex issues, and allowing individuals to listen and adapt as they could perceive merit in the arguments being presented.

Thus, the development of the course and the learning environment may be said to be firmly grounded in an understanding of the complex nature of the social world and the social construction of reality in ways which were derived from a more interpretive approach to sociology, psychology, and philosophy. It was also obvious that the ideas from various literatures which had been accumulated to aid the creation of the simulation and the learning environment were drawn from a broad and disparate group of formulations.

On Qualitative Research

Given the nature of the values and orientation underlying the course, one logical beginning point was the consideration of a qualitative research method which would take into account both the commitment to involving students in understanding and dealing with the complexities of the school's social world and the acceptance of the social construction of reality. Additionally, it would deal with the wide ranging literatures consulted in the development process.

The methodological characteristics of what is variously called qualitative (Patton, 1990; Bogdan & Biklen, 1982), or naturalistic (Smith and Glass, 1987), or conceptual (Garman, Piantanida, Goodwin, Leukhardt, Holland, Minick, & Andrusko, 1986) research seem to have a number of characteristics which would support this fundamental nature of the course. Bogdan and Biklen (1982) described five essential characteristics of qualitative research:

> 1. The natural setting should provide the direct source of data and the researcher should be the key instrument.
> 2. Qualitative research should be descriptive.
> 3. There is more concern with process than with outcomes or products.
> 4. Data are analyzed inductively.
> 5. Finding meaning or developing understanding is an essential concern.
>
> (pp. 27 -30)

Patton concurs and discusses these ideas as *themes* rather than characteristics. He makes five others explicit, expanding on ideas which are subrogated or implied in

Bogdan and Biklen. Patton's (1990) additional five themes are:

6. The adoption of a holistic perspective.
7. The attendance to context sensitivity.
8. The use of a unique case orientation in the research.
9. The acceptance of empathic neutrality.
10. The use of design flexibility in the conduct of the study.

(p. 40)

The first two of these are intuitively obvious, but perhaps a further word of explanation is needed for the final three. In claiming that qualitative research has a *unique case orientation*, Patton is stressing that all comparisons of multiple sites or multiple occurrences must proceed from individual case studies. It is the quality of these first level case inquiries which govern the quality of any further work. By *empathic neutrality*, he means that while a researcher must recognize and deal with her or his personal experiences, biases, and "empathic insights" (p. 41) it is vital that the researcher take a "neutral non-judgmental stance toward whatever content may emerge" (p. 41). This should not be confused with the acceptance of the objective stance of the logical positivist research paradigm. Naturalistic researchers are not urged to maintain some ephemeral objective distance from the subjects and the work. Rather they are exhorted to consciously recognize and deal with their biases on an ongoing basis and accept whatever results their careful study may offer without yielding to prejudgment. Patton (1990) cites Scriven in emphasizing "the importance of being factual about observations rather than being distant from the phenomenon being studied. *Distance does not guarantee objectivity; it merely guarantees distance*" (p. 481).

Finally, *design flexibility* refers to a belief that it must be possible for the structure or approach to the inquiry to adapt as the study progresses or situations change. Patton claims that by clutching firmly to a flexible approach the researcher "avoids getting locked into rigid designs that eliminate responsiveness" (p. 41) and "pursues new paths of discovery as they emerge" (p. 41).

These qualities are born out by other general descriptions of qualitative research (Husen, 1988; Smith and Glass, 1987), but they do not include the incorporation of a variety of literatures into the study process as data. Others have, however.

Such an assemblage of cross discipline writing has been designated by some authors as a collection of technical and non-technical literature (Strauss & Corbin, 1990) and by others as multivocal literature (Ogawa and Malen, 1991). Such sources have been discussed as a viable source of research data for some time (Garman et al., 1986; Glaser & Strauss, 1967; Lindblom & Cohen, 1979; Ogawa & Malen, 1991; Strauss & Corbin, 1990). Special approaches to research designs seeking to use such multi-vocal literatures have been described (Glaser & Strauss, 1967; Ogawa & Malen, 1991; Strauss & Corbin, 1990; Yin, 1991, 1989).

The use of various literatures as an integrated data source is seen as an important element of this study. Given the philosophical approach to the study and given the variety of philosophical and theoretical bases which from which the ideas on administrator preparation, experiential learning, constructivist learning, simulation theory, and materials design have emerged, it was not possible to provide an integrated derivation of the various assertions in the literature which might be tested. Instead, it was proposed to use them as a part of the data structure of the entire project, with a view to exploring how aspects of this literature are applicable (transferable) in the context of information gathered directly from working with the student participants. In this way the literature helped establish a basis for understanding and interpreting research information and in the establishment of any general statements of applicability which might emerge.

The Choice of a Study Design

From amongst the variety of designs which have been described for qualitative research studies, there are two which seem to offer the most compatibility with the needs of this research project. One is a grounded theory design (Glaser & Strauss, 1967; Strauss & Corbin, 1990). The second is an exploratory (Yin, 1991, 1989) or interpretive (Merriam, 1988) case study design. It could be argued that they are not mutually exclusive. Both are suited to the development of theoretical statements through the use of multiple data sources. The methodology described by Yin (1989) is less flexible than that described by proponents of grounded theory, such as Strauss and Corbin (1990) or Turner (1981), in that Yin (1989) describes the use of a theory as a necessary pre-condition to conducting a case study, even an exploratory case study (p. 37). Further, the methodology described by Yin requires that all case instances be completed separately and independently before any cross-analysis is conducted. In a constant comparison approach to grounded theory, on the other hand, "data collection, coding, analysis, and theorizing are simultaneous, iterative, and progressive" (Kozma, 1985, p. 304). However, Yin is not the only theorist of case study methods, although he is one who describes exploratory case studies explicitly. Merriam (1988) states that a qualitative case study design "is chosen precisely because researchers are interested in insight, discovery, and interpretation rather than hypothesis testing" (p. 10), seeking "holistic description and explanation" (p.10). She goes on to list four essential characteristics of qualitative case studies. They must be particularistic, descriptive, heuristic, and inductive.

A *particularistic* case study would focus on a "particular situation, event, program, or phenomenon" (p.11). The *descriptive* aspect would require a "rich, 'thick' description of the phenomenon under study" (p. 11), while the *heuristic* dimension would require that the study seek to "bring about the discovery of new meaning, extend the reader's experience, or confirm what is known" (p. 13). An *inductive* case study relies on inductive reasoning (p. 13), through which "generalizations, concepts, or hypotheses emerge from an examination of data -- data grounded in the context itself" (p. 13).

Bogdan and Biklen (1982) describe a very open ended, almost free wheeling approach to how researchers undertake qualitative case studies:

> They look for clues on how they might proceed and what might be feasible to do. They begin to collect data, reviewing and exploring it, and making decisions about where to go with the study. They decide how to distribute their time, who to interview and what to explore in depth. They may throw aside old ideas and plans and develop new ones. They continually modify the design and choose procedures as they learn more about the topic of the study. In time, they make specific decisions on what aspect of the setting, subject, or data source they will study. Their work develops a focus. (p. 59)

With this in mind the study being developed has been designated as an exploratory case study using an interpretive methodology. The intent is to explore the learning which is going on in the simulation course and how it is influenced by the design of the simulation itself. It will use inductive data analysis methods which should result in a series of working hypotheses which others may find transferable to their own contexts.

The study undertaken in this research is conceptualized as a case represented by three interrelated iterations, namely, each of three offerings of the simulation course. Each of these three offerings represents a single, contained instance of the simulation course experience and each instance has the same participants for the duration. The first instance of research involvement in the course in the summer of 1990 took the form of an exploration of ideas and approaches to data collection and interaction with participants. Following approval at a preliminary meeting with the investigator's supervisory committee in January 1991 and an ethics review, two other course groups were met using a consistent methodology for data collection (see Table 4.1). Even with this consistent approach to data collection, as individual students were interviewed and observed, and as the researcher interacted with the literature, changes occurred in the character of the interviews.

The data sources for the study exploited the available data within the course environment to its fullest. It included data available from previous class surveys, and a variety of information from various technical and non-technical literatures. Data directly available from the course environment included observations in almost all class sessions; observations during the simulation labs; interviews with observed simulation lab participants; examination of student responses saved on the computer system; study of the reflective logs developed by students; and confirming surveys of all class participants. It was hoped that this breadth of data types and the use of three class cases would provide a basis for triangulation of data (Patton, 1990, p. 187) to strengthen the study.

Course Offering	Instructor	Number of Individual Observations	Number of Interviews	Number of Secondary Participants
Ed Adm 595 July 1990 (pilot)	Dr. W. Maynes & Dr. K. Ward	3	3	9
Ed Adm 595 January 1991	Dr. W. Maynes	3	3	9
Ed Adm 595 January 1992	Dr. W. Maynes	3	3	8

Table 4.1: Data Collection

In contemplating the structure of the inquiry and the importance of the simulation to the learning process a decision was taken to limit student interviews to those who had also been observed during a simulation exercise. This was done to couple the simulation exercise and this inquiry into student learning more directly. These restrictions meant that only three students out of each class of twelve could be observed and interviewed as there were only three simulation labs per course. However, other data in the form of student responses during the simulations, class observations, and surveys involved all class participants.

To provide a more historical perspective and the perspective of a course developer and course instructor an interview was undertaken with Dr. Gordon McIntosh, a partner in the development of the simulation course since its inception. To offer a second perspective by a course developer and the most recent instructor in the simulation course, Dr. Bill Maynes was also interviewed. These interviews covered much of the same material as the student interviews, but in a more general and holistic way.

The Pilot Study

During the summer session of 1990 a pilot study for this research was undertaken. With students' agreement and permission, a number of activities were undertaken to develop an understanding of the methods that might prove most effective for the research. Observations of all class sessions were undertaken, as was a review of the students' reflective journals (then called log books). In addition, the following methods were used: a group interview with students at the end of the course, three observations of students during the simulation lab activities to explore the preferred method of observation, and three follow-up interviews with students who had been observed in the lab to survey the types of responses which would be elicited by various questions.

Perhaps the most difficult part of the pilot study was establishing the preferred method for observing students during the lab. Three observation methods were chosen for testing, a different method for each available lab session. It was decided, based on the researcher's experience, to try a one-on-one observation, a video taped observation, and an observation of several students at a time during the work session. One of the possible benefits, had the video recording method proved satisfactory, would have been to extend the number of available subjects. The video taping method did not, however, work out satisfactorily. Technical limitations in viewing both the screen and the participants' reactions in close temporal or spatial proximity to each other, and the loss of the insights the researcher gleaned from watching participants' body language and reactions to other transient stimuli in the environment, were the primary reasons for deeming this approach unsatisfactory. Similarly, attempts to observe several students at one time during the simulation were also forsaken as the data from each interaction were too fragmented to permit the researcher to pursue these with the students in a meaningful way during the follow-up interviews. This left a detailed observation of a single student during each simulation lab as the chosen method of observation.

The interviews of the students who had been observed were also tested during the pilot study. A semi-structured approach was chosen for the interview to permit the interviewer the latitude of pursuing interesting lines of inquiry which might emerge during the interaction with the student. The questions and the approach proved to be satisfactory, with some minor modifications, and the interviews for the study were conducted in a semi-structured format beginning with the questions outlined in Appendix C.

It was decided to retain class observations both as a way of providing more interaction between the researcher and the class, and to put them at ease with his presence. It became obvious quickly that student logs would be a valuable source of data for this research and consequently this was also included as a data source for the research itself. The group interview also provided some interesting data and served as something of a collective check on individual statements in interviews and in journals.

Some data were retained from the pilot study. The observation notes from the simulation labs and the related interview transcripts were retained, along with notes of classroom observations, and data from the group interview. The student log books were returned to the students, and copies were not retained for subsequent study. The available data have been integrated with the data from the main study, with the approval of the researcher's supervisory committee.

Participants

A standard Department of Educational Administration ethics review of the proposed research was undertaken before any participants were approached.

Two offerings of the course and the data retained from pilot study provided the research base for the study, as detailed in Table 4.1. This was dictated by timing, to a certain extent, as only one section of the course is usually offered during a thirteen week term in each calendar year.

The proposed research activities were described in full to all participants in a course section at the beginning of term and they were asked to volunteer to become involved. Anonymity was promised with regard to all research descriptions and reports. The study design made it unavoidable for the researcher to know the identity of the subjects, however, connections between the research data and the subjects have been shielded from everyone else. Confidentiality was possible for all phases of the research project and the researcher undertook to ensure confidentiality with regard to all data which were gathered on (or afforded by) participants. As previously indicated, all class participants contributed data to the study, but only nine were interviewed.

The main observation/interview subjects for the study were chosen through the technique known in grounded theory as theoretical sampling (Kozma, 1985; Strauss & Corbin, 1990). According to Kozma (1985), in theoretical sampling the sample subjects for research work are chosen to "facilitate the generation of theory, so cases are selected for the theoretical relevance of their similarities and differences" (p. 305). In order to encompass the usual range of students in the class, each case sample included one veteran administrator, one novice administrator, and one other student who stood out for some reason such as computer phobia or a unique approach to administration. A perceived ability to articulate their thoughts and experiences was also a factor in this choice of subjects. In all, nine subjects from a total of three sections participated in the refined study procedure and three others participated in the preliminary exploration.

Standards of Rigor in Qualitative Research

Proponents of qualitative research methods continue to be concerned that studies involving qualitative methods are not necessarily taken as serious science (Lincoln & Guba, 1985; Patton, 1990; Strauss & Corbin, 1990). Earlier approaches which saw qualitative research as the soft, preliminary work that needed to be done prior to serious hypothesis testing through quantitative research still haunt qualitative research (Bogdan & Biklen, 1982; Miles & Huberman, 1984; Patton, 1990). Qualitative researchers, however, continue to develop and refine their methodologies and philosophical bases in order to present ever stronger cases for qualitative research as worthy of consideration in its own right, particularly since the world view of a great many qualitative researchers does not allow for the possibility or desirability of follow up work in the quantitative tradition.

Patton (1990) is one methodological scholar who shares this concern for presenting qualitative research as worthy of acceptance in its own right for its methods and findings. He describes three levels at which credibility and quality issues are addressed in qualitative research:

> (1) rigorous techniques and methods for gathering and analyzing qualitative data, including attention to validity, reliability, and triangulation;
>
> (2) the credibility, competence, and perceived trustworthiness of the qualitative research; and
>
> (3) the philosophical beliefs of evaluation users about such paradigm-based preferences: objectivity versus subjectivity, truth versus perspective, generalizations versus extrapolations, and theory versus action.
> (p. 491)

Lincoln and Guba (1985) share Patton's concern for rigor and state that:

> Conventionally inquirers have found it useful to pose four questions to themselves:
>
> (1) "Truth Value": How can one establish confidence in the "truth" of the findings of a particular inquiry for the subject (respondents) with which and the context in which the inquiry was carried out?
>
> (2) Applicability: How can one determine the extent to which the findings of a particular inquiry have applicability in other contexts or with other subjects (respondents)?
>
> (3) Consistency: How can one determine whether the finding of an inquiry would be repeated if the inquiry were replicated with the same or similar subjects (respondents) in the same (or similar) context?
>
> (4) Neutrality: How can one establish the degree to which the findings of an inquiry are determined by the subject (respondents)

> and conditions of the inquiry and not by the biases, motivations, interests, or perspectives of the inquirer? (p. 290)

It is quite obvious that Lincoln and Guba's terms could be applied to both quantitative and qualitative research methodologies. There seems to be some acceptance on the part of qualitative researchers that it is important to retain the traditional parameters defining good science. For instance, Strauss and Corbin (1990) maintain "that the usual canons of "good science" should be retained, but **require redefinition in order to fit the realities of qualitative research, and the complexities of social phenomena**" (emphasis in the original) (p. 250). With this in mind it is useful to consider the four question areas raised by Lincoln and Guba (1985), both with regard to any adaptation necessary for naturalistic inquiry and useful techniques applicable to the study being described.

Truth value. In addressing this problem Lincoln and Guba (1985) point out that "when naive realism is replaced by the assumption of multiple constructed realities, there is no ultimate benchmark to which one can turn for justification -- whether in principle, or by a technical adjustment of the falsification principle" (p. 295). Lacking this approach to a benchmark one must turn away from the conventional science approach to establishing "internal validity," and establish the "truth value" of the inquiry in some other way. Indeed, scholars of qualitative methodologies such as Lincoln and Guba, and Patton, have turned from using the phrase "truth value" in describing qualitative research because of the improper implication of the results of this type of inquiry. They prefer the term *credibility* instead.

Lincoln and Guba (1985) list five methodological techniques for enhancing the credibility of a study. Two of these have been adopted for use in the research project described herein: (a) activities increasing the probability that credible findings will be produced, and (b) negative case analyses.

The activities which lead to a greater likelihood of credible findings are three, according to Lincoln and Guba: prolonged engagement, persistent observation, and triangulation (1985, p. 301). *Prolonged engagement* involves spending adequate time with the project to permit "learning the culture, testing for misinformation introduced by distortions either of the self or of the respondents, and building trust" (p. 301). As the researcher has been involved with the development of the simulation program for eight years and has been a graduate student in the Department of Educational Administration for a considerable time in two degree programs, he has a thorough immersion in the overall culture of the department. He also has spent class and lab time with the majority of offerings of the course in which the simulations are embedded since the course was designed. Additionally, he spent time with each class group selected for the research study from the first class through the last in order to seem as much a part of the group as possible. However, his chosen activities -- observing students in the lab and in seminar activities -- mitigated against his becoming a full participant-observer. Even so, it was hoped that such an investment of time with each class would build trust with the participants and help eliminate distortions in the data being gathered.

Persistent observation was also built into the design of the study in that the researcher was not simply present with the class during each of the periods when they met, but had a carefully worked out strategy for observing and noting significant events during the seminars and class activities.

Triangulation is comprised of four different modes, all of which are dedicated to trying to get at the same constructs or formulations from different directions. In so doing the researcher cross checks facts and concepts, thus aiding credibility. The four modes of triangulation involve using different sources, methods, investigators, and theories. In this study the researcher achieved triangulation by using multiple sources from within and across differing class groups. This also involved different methods of data collection: observation, interviews, survey, analysis of students' reflective journals, and analysis of textual data written to computer memory by the student-principals as a part of the simulation exercises. Checking against multiple theories was also possible in this study in the sense that different theoretical perspectives from the literature, on differing aspects of the learning experience and the simulation were included as a part of the data set. These theoretical ideas were considered along with the data obtained directly through other methods in framing the interpretations which emerged. The use of multiple investigators was not possible in a single researcher study.

In addition to undertaking activities which would enhance the credibility of the work, the researcher developed a plan of negative case analysis. This actually forms a part of the grounded theory methodology as described by Strauss and Corbin (1990). They insist that during the coding and categorization activities it is important to look out for negative cases and to understand that they "add variation and depth of understanding" (1990, p. 109). Strauss and Corbin also point out that:

> When a negative instance of action/interaction appears, it becomes very important to trace the line of conditions leading to it, in order to determine if this is failure or change in action/interaction. Was our original thinking wrong? Or does this negative instance indicate a variation, a new avenue of thought to be pursued? (p. 188)

The technique of negative case analysis as described by Lincoln and Guba (1985) is very much the same:

> Negative case analysis may be regarded as a "process of revising hypotheses with hindsight." The object of the game is continuously to refine a hypothesis until it *accounts for all known cases without exception* (emphasis in the original). (p. 309)

Applicability. As stated earlier, applicability has to do with the degree to which the findings of one research study may be useful in other contexts, or with other respondents. The analogue to applicability in conventional science methods is external validity, according to Lincoln and Guba (1985). External validity is concerned with the generalizability of results from one scientific study to another. However, qualitative researchers tend to be opposed philosophically to the concept of generalization and prefer to discuss applicability in terms of transferability. According to Lincoln and Guba (1985):

> in order to be sure (within some confidence limits) of one's inference, one will need to know about both sending and receiving contexts. We move then from a question of generalizability to a question of transferability. Transferability inferences cannot be made by an investigator who knows only the sending context. (p. 297)

They go on to state:

> It should be clear from the above that if there is to be transferability, the burden of proof lies less with the original investigator than with the person seeking to make application elsewhere. (p. 297)

Lincoln and Guba also assert that transferability is important in a rigorously conducted qualitative study. To further this they have listed and discussed the four threats to external validity identified by LeCompte and Goertz (1982), asserting that naturalistic studies must also confront these supposed threats. The four are:

1. Selection effects: "the fact that constructs being tested are specific to a single group, or that the inquirer mistakenly selects groups for study for which the constructs do not obtain." (Lincoln & Guba, 1985, p. 291)

2. Setting effects: "the fact that results may be a function of the context under investigation." (Lincoln & Guba, 1985, p. 291)

3. History effects: "The fact that unique historical experiences may militate against comparisons." (Lincoln & Guba, 1985, p. 292)

4. Construct effects: "The fact that the constructs studied may be peculiar to the studied group." (Lincoln & Guba, 1985, p. 292)

   While this fourth effect may seem very like the definition of selection effects, LeCompte and Goertz (1982) are referring to the extent to which analytical contructs are understood in the same way between groups, "across time, settings, and populations" (p. 53) and secondly, the degree to which different groups agree on "how the effects of observed phenomena are construed" (p. 53).

A moment's reflection on each of these in the context of naturalistic inquiry should satisfy one that far from being threats to the validity and transferability, these are strengths of qualitative research. As Lincoln and Guba declared in an earlier work, "it is virtually impossible to imagine any human behaviour that is not heavily mediated by the context in which it occurs" (1981, p. 62).

In this study all four of the listed effects are operant. The inductive methods in grounded theory, as in most naturalistic research, generate working hypotheses which are definitely a function of the selection of participants, the setting, the history of the group and of the researcher. All of these will definitely influence the constructs which are developed. The responsibility of the researcher here is to provide extensive descriptions to assist those interested in transfer to assess the similarities between the sending and receiving sites as they make a decision about the possibility of transfer.

Consistency. Lincoln and Guba (1985) again derived the idea of consistency as an analogue to a concept within traditional science. In this case the concept was reliability and they use Kerlinger's terms to described it as "synonymous with dependability, stability, consistency, predictability, accuracy" (p. 292). However, most of these ideas are once more antithetical to the basis of naturalistic research. Predictability and stability are obviously terms to which a qualitative researcher would give little credence. On the other hand, Lincoln and Guba point out that "reliability is not prized for its own sake but as a precondition for validity; an unreliable measure cannot be valid" (p. 292). If one is interested in issues of credibility and applicability (validity) they argue, one must attend to reliability and qualitative researchers do not wish to have their work dismissed as unreliable.

Lincoln and Guba suggest the term dependability as the naturalistic analogue to reliability. They suggest four possible ways of establishing dependability. One of these, *stepwise replication*, they do not recommend. The other three methods can be addressed within the context of the present study. First, Lincoln and Guba (1985) present the argument (and they admit its weakness) that by attending to credibility issues one has attended to dependability issues. As previously discussed credibility is addressed in the study in a number of ways.

Secondly, they suggest the use of *overlap methods* (p. 317), which again is simply methodological triangulation and "one way of carrying out Argument 1 and not a separate approach" (p. 317). The use of triangulations through different methods of data gathering is provided for in the present study.

The third method which relates to the study being undertaken is that of an inquiry audit. Lincoln and Guba point out that in this process an external auditor is called in to examine the process of the inquiry and the product of the inquiry in the form of the "data, findings, interpretations, and recommendations" (p. 318). While time and resources in the current project did not permit an external auditor to be involved, other than in the sense that members of the doctoral committee might be considered auditors, it was the responsibility of the researcher to ensure that the process is described and the records are kept in such a way that an audit could be undertaken.

Neutrality. In dealing with the question of how it may be possible to establish that the findings of a qualitative study are "determined by the subjects (respondents) and conditions of the inquiry and not by the biases, motivations, interests, and perspectives of the inquirer" (Lincoln & Guba, 1985, p. 290), the researcher adopted Lincoln and Guba's suggestion for the replacement of the conventional term in the scientific method, objectivity, with another. In this case the replacement term is *confirmability*. The concept of confirmability suggests that given the same (or highly similar) populations, contexts, and goals, a second researcher would derive similar categories, links, and working hypotheses; in essence, confirm the findings of the first researcher. At the same time the term does not imply an unnatural state of detached objectivity on the part of the researcher. As Lincoln and Guba (1985) assert, substituting the concept of confirmability

> removes the emphasis from the investigation (it is no longer his or her objectivity that is at stake) and places it where, as it seems to the naturalist, it ought more logically to be: on the data themselves. The issue is no longer the investigator's characteristics but the characteristics of the data: Are they or are they not confirmable? The naturalist prefers this concept to that of objectivity. (p. 300)

The major technique for establishing confirmability is the confirmability audit, a technique which is seen to link with two other techniques for establishing confirmability -- triangulation and the keeping of a reflexive journal.

The confirmability audit, like the inquiry audit for dependability, is conducted by an outside auditor. It uses a process so similar to that of the inquiry audit that Lincoln and Guba assert that "a single audit, properly managed, can be used to determine dependability and confirmability simultaneously" (p. 318).

In this study, the techniques of triangulation discussed previously provided some elements of confirmability and the preservation of materials to provide an audit trail provide others. The data and note materials saved to maintain an audit trail included notes from the simulation observations and class sessions; copies of students' reflective journals; audio tapes and transcriptions of interviews; notes of group interviews; printouts of student work during the simulation labs; the working papers used in sorting and categorizing data; notes, audio tapes, and a videotape from the pilot study; and questionnaire materials used in earlier offerings of the course. A reflexive journal was not kept for the project as the researcher admits to being a poor diarist.

Comments on Ethical Matters

The research activities undertaken in this study do not seem to involve ethical concerns of any moment. The study as a whole underwent the required ethics review and was approved in January, 1991. The activities have been carried out in classes of graduate students who were given information about the study and invited to participate (informed consent).

The instructor for the course was not the investigator's advisor, and as the course has been offered in a credit/non-credit form any pressure related to grades would not seem to be a factor (absence of coercion).

With the exception of information obtained from the course evaluation questionnaires, the data obtained in this study could not be anonymous because of the methods of study. The investigator, however, assured confidentiality of information by establishing a system of identifying all records or notes with numbers rather than names.

Limitations and Delimitations

One limitation of the proposed study is the involvement of the investigator. The principal investigator is committed to the utility of simulations in education and has been involved in the design, production, and implementation of the principalship simulations from the beginning. This may have limited the investigator's ability to distance himself from student responses to the materials during the evaluation activities, to understand clearly what students may be trying to communicate, and to interpret the data without attempting to defend aspects of the current design. To deal with this in a single investigator study is difficult. However, the investigator attempted to address this limitation by involving himself in an active search for alternative explanations when evaluating data and constructing explanations. In this way the temptation to accept particular solutions attractive to the investigator was lessened.

A second potential limitation to be considered is a selection effect, one of the threats to applicability listed by Lincoln and Guba (1985). As the course is optional, it is possible that students choosing the course know they would do well in this type of learning environment, that their enrolment constitutes, in effect, a form of metacognitive pre-selection. A first consideration of this limitation would seem to reveal it as one which could only be addressed through anecdotal evidence from students, who often had no previous experience with this type of learning. The alternative would be to resort to a requirement for all students in the masters' program to take the course, or to turn to some form of "unnatural" random selection, assigning graduate students to the course regardless of their program wishes. The first of these does not seem feasible, and the second seems undesirable, as it is at odds with approaches to naturalistic inquiry. It also seems possible to suggest that this limitation is really a non-question. It doesn't really matter if students do involve themselves in selecting courses in which they are more likely to succeed. The aim is to prepare them to be better educational administrators, and if the simulation course experience aids this process, so much the better. If the course were to become mandatory, additional study could be undertaken to establish the effectiveness with the broader group and to understand whether any selection effect had been operating.

A third possible limitation on this study is one which may be called an interaction effect. Lincoln and Guba (1985) describe the disturbance which an investigator may cause in the setting in which research is carried out, and how that disturbance will likely cause some change in the social system which is being studied. Such an effect is virtually a given in this study; the only question is whether the effect is of smaller or larger impact. During interviews with students following observations of their performance in the simulation work sessions, one or two students made comments about the effect of the observer on their performance. Elaine and Rita were the most vocal about the effect:

> Yes, and with you sitting there, I didn't think it would make me nervous, but I think it did at first, and probably because you were sitting behind me, and I couldn't see you, and maybe that's just a human reaction when you can't see someone, and I turned to you and whenever someone is near, or is included in an experience I tend to talk to them. I'm just a high verbal person and so that's why I spoke. If it had shut down the machine when you were not there I would have solved my own problem, I would have just escaped and started over again, and at the end of the briefing I would have just escaped and gone on to the first item, but I think I was maybe including you more in my experience than I had, and after your answer there I knew you were not expecting me to look at you, so I didn't after that. (Elaine, Interview)
>
> Secondly, having an onlooker over my shoulder writing down my every reaction was completely nerve wracking. After ten minutes or so I asked David Mappin to please go away until I got into my task and wasn't second guessing my every move because he was observing me. He was back before I knew it and by twenty minutes into the exercise I was floundering like a beached whale. (Rita, Journal)

As the simulation labs went on, Elaine settled down, but for Rita, a nervous person with little administrative experience, the simulations continued to be a struggle. For most students, however, the on-going presence of the researcher did not seem to be a problem and some of them took the opportunity to ask questions and learn more about simulation methods. Given the similarities between what the students who were observed and interviewed did and recounted, and what other students reported in the seminars and in their journals, the researcher concludes that the overall interaction effect was smaller, rather than larger, but it would seem certain that the effect was present.

Perhaps the greatest concern with this study is an epistemological one. When one is providing a pre-service educational program for a graduate student who wishes to become an educational administrator, how can one truly know that the experiences offered lead to improved performance in the role? There is a similar question to be raised with regard to providing professional development in the same graduate programs to practicing administrators. The only measures that seem to be readily available are self-report measures, which are perceived to be flawed because of the many psychological and sociological factors which can distort the nature of the response obtained. Even if one were to undertake a longitudinal study of people who had gone through a particular educational experience, the number of confounding factors would seem so large as to be very difficult to overcome.

Summary

Given the nature of simulation activities and the orientation taken by the researcher to understanding how learning takes place through involvement with them, it seemed that an interpretive approach to this research was the most appropriate. The background to and explanations of the study methodology provided in this chapter substantiate this, and the efforts to account for and minimize potential methodological difficulties have ensured a high standard of inquiry. The next chapter presents the analysis and interpretation of the data with a further consideration of the simulation environment and the specifics of course activities as they affect student work and learning in the simulation.

Chapter Five

Describing and Interpreting the Simulation Environment

Overview

The simulation environment, as described earlier, consists of an individual carrel for each learner equipped with a microcomputer, monitor, videodisc player, and a telephone. The computer is attached to a local area network to allow students to print their responses to simulation items. The computer hard drive contains files to create an interface to ease access to the various elements of the simulation materials. These elements include an electronic office for the principal, with all the files the student Principal Metzger might have available; a personal notebook for the student's own use; a response record for noting the course of action to be taken and preparing any necessary notes, letters, or documents; and a series of full text reference materials to be used at any time as the simulation progresses. Also from the interface the student can access two groups of video materials. One group includes the three video orientations the student principal's experience -- meetings with the superintendent of schools, the outgoing principal, and a community member at the local cable station. These are all viewed in class as part of the overall orientation to the course. The second group is comprised of short video staff profiles for each member of the teaching and support staff, illustrating the personalities, relationships, and in the case of the teachers, the classroom approach of each.

In this chapter the simulation environment will be described in more detail to provide a basis for the analysis of that milieu which follows, together with a discussion of how that environment is integrated with the graduate course. The description and interpretation will deal at first with general questions of how well the simulation experience replaces a work experience and then deal in turn with each element of the simulation. The elements of the simulation are presented in the order the student would generally encounter them, beginning with the computer interface and student navigation in the computerized learning environment.

The interpretation and subsequent analysis is aimed particularly at providing descriptive and interpretive information useful in answering the second of the research questions posed for this study: How well does the current design for the simulation materials, with its various electronic sources of information, assist students to establish a useful, ongoing linkage between knowledge obtained through academic preparation and knowledge obtained through the problems they face in professional practice? To what extent does this environment assist in developing their understanding of the administrative role? Secondarily, the information and understandings obtained from the detailed examination of the simulation elements will help to answer question four: Using the experiences with the Project Decide simulation materials and current relevant theoretical and scholarly writing, what advanced design might be crafted for a simulation/information environment for the training/education of administrators?

The Simulation Environment

Each of the three simulation work sessions in the course begins with a video briefing of approximately three minutes from the school secretary and the assistant principal who provide essential details of important things which have happened while the principal has been away. This briefing both highlights items which students should be watching for, and it serves as one method of conveying additional information regarding some of those items. Once students have viewed the briefing they enter the work session and the timed 2 1/4 hour work session begins. Students are apprised of the time by a small digital clock, fed from the computer system clock, and displayed in the lower right hand corner of the screen. The clock begins at two hours and fifteen minutes and decrements itself to zero as the session progresses. With fifteen minutes remaining, and again at five minutes, the system displays a time warning to students to allow them to organize their last work efforts and to ensure they are able to print all of their responses. When the clock reaches zero students are given a two minute grace period and then the system freezes and displays a message advising them that the work session is over. Students are allowed to return to the area the following day, if they choose to, and work to complete any items in the simulation to which they had not attended during the timed work session.

Each work session has twenty one to twenty four problems with the individual problems presented in one of three forms: as a text item in the form of a letter or note, as a video item in which a staff member or a parent approaches the principal, or as an interruptive crisis presented by video at predetermined times. When an interruptive crisis problem occurs, the student must attend to it before returning to the work in which she or he was previously engaged. Students may choose which of the regular video or written problems they wish to work on in an order which suits them, from a list. Additional information may be offered to augment the initial text or video presentation of the problem. These may be in the form of 'attachments' to the work session item or they may be letters or memos contained in a student file or some other school file. The attachments may be working documents from within the school, from central office, or from some other source. They might be the draft of a policy item, a proposal for some activity, or additional letters or notes. Occasionally, as a means of simulating the memories the principal would have of particular interactions with staff members, students, or community members concerning certain items, students are able to view "memory flashes". These "memory flashes" are short video sequences in which they are shown what people may have said to them regarding the issues being considered. These 'memory flashes' provide both direct information about the problems and indirect information such as the attitude of individuals towards certain people, policies, or values.

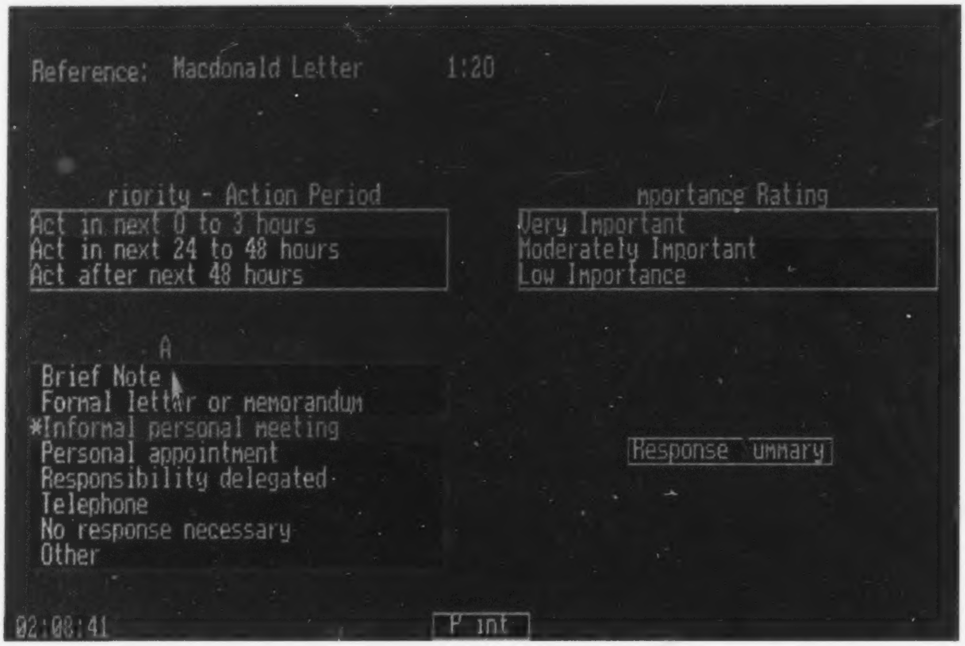
The problem items are also augmented by the most interactive feature of the instructional strategy and one of the most popular aspects of the simulation -- a telephone call. Three times during each work session the telephone on the desk of the student rings and they must deal with the caller who is making inquiries, pleading a case, or seeking assistance with a problem. Each caller is a role player working from a prepared scenario which is consistent between offerings of the course. The callers can be highly emotional and they are sometimes instructed to be verbose and very persistent. At the end of each call the caller completes a form (see Appendix "D") describing their interaction with the student Stacey Metzger. There is no claim to special expertise or evaluative ability on the part of these callers; they are simply asked to rate each student as if they were the person whose identity they have assumed and describe their feelings for how the principal of Pembina Elementary School dealt with them and their satisfaction with this encounter. The completed forms are given to the students at the next debriefing session.

The interruptive crisis items are not listed and students do not know when they will occur. Each work session has two such interruptions. Each begins with someone entering the principal's office to inform the principal of an event which requires immediate attention. The events may be as disparate as a report of an attempt to lure two young girls into a car on their way to school, a report of a serious fight between students, or the entrance of a large, angry man who has been accused by his wife of wife-beating, demanding to know where his wife is. In a few cases, the students are asked to respond to the initial presentation in the same way they respond to other items. In most cases, however, they are given a menu of possible responses after the initial problem is presented. They can then choose a course of action, or look for additional information. This iterative cycle of seeing the indirect consequences of their actions and then being able to make additional choices is repeated at least once, and often a student can pursue considerably more choices, depending on the information they seek and the choices they take.

The problems which are presented to students are not always the problems which need to be solved. In the same way that the "presenting problem" which a patient describes to a physician may be related to something else or a symptom of an initially unrecognized medical condition, so may the problems which are presented to Stacey Metzger signal larger organizational problems. For example, clusters of the problems presented in the first two work sessions will lead students to an understanding of some serious staff and morale problems which need to be addressed. Also, major problems with an individual staff member emerge over the course of three work sessions leading to a series of extremely difficult decisions for Stacey.

Regular work session items and the simplest interruptive crisis items are responded to using a response record tool. After viewing an item students can choose the 'response record' button and from a list of all items they have viewed, choose the one to which they wish to respond. A print of the response record screens is once again shown in Figure 5.1 and 5.2. From within the response record the student assigns a priority and an importance to the item. Priority is selected on the basis of when action must be taken: in the next three hours (high priority), in three to twenty-four hours (medium priority), in twenty-four to forty-eight hours, or in longer than forty-eight hours (low priority). A differentiation is made between priority and importance in these exercises as it seemed crucial for students to begin to separate urgency in some matters from their overall significance in the operation of the school. For example, talking to a parent who telephones may not be of great importance for the school, but most principals would give it a fairly high priority. Importance is assigned as either low, medium, or high. Students are also asked to assign one or more forms of communication to describe their next actions. For each communications action the student is taken to a text editor screen. On this screen the student must describe their actions. If they have assigned a priority of less than three

hours to the item they are expected to describe their actions fully, and if the chosen communication form is a letter or a note, they are expected to write the text of that letter



Reference: Macdonald Letter 1:20

riority - Action Period

Act in next 0 to 3 hours
Act in next 24 to 48 hours
Act after next 48 hours

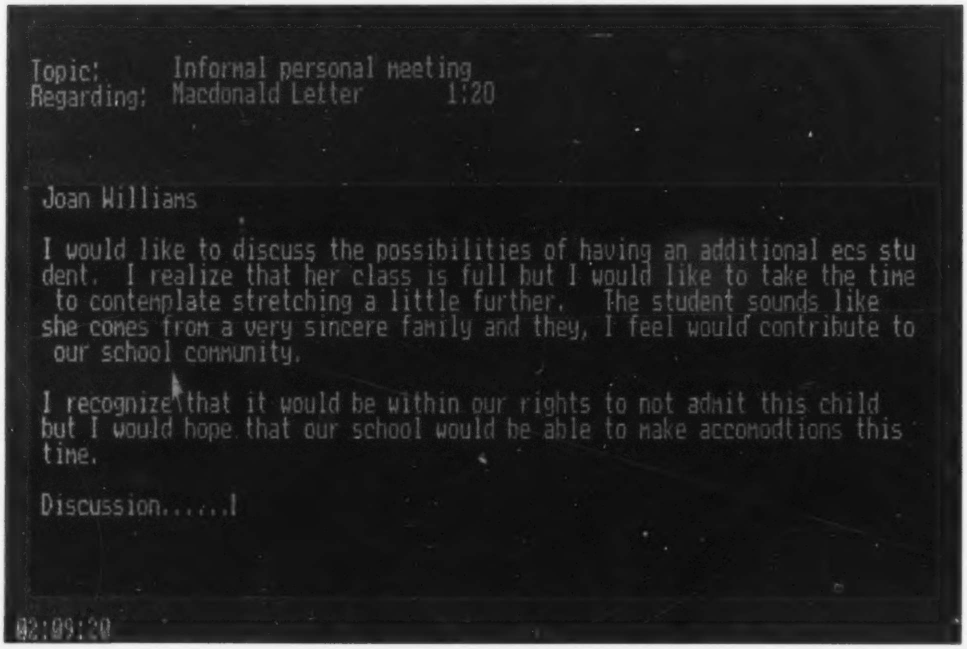
mportance Rating

Very Important
Moderately Important
Low Importance

A

Brief Note
Formal letter or memorandum
*Informal personal meeting
Personal appointment
Responsibility delegated
Telephone
No response necessary
Other

Figure 5.1. Completed Student Response Record, Screen 1



Topic: Informal personal meeting
Regarding: Macdonald Letter 1:20

Joan Williams

I would like to discuss the possibilities of having an additional ecs student. I realize that her class is full but I would like to take the time to contemplate stretching a little further. The student sounds like she comes from a very sincere family and they, I feel would contribute to our school community.

I recognize that it would be within our rights to not admit this child but I would hope that our school would be able to make accomodtions this time.

Discussion......

Figure 5.2. Completed Student Response Record, Screen 2

or note. For less urgent priorities less complete responses are expected. Students print all of their item responses for reference in the seminar, or in certain cases, to be turned in to the instructor. All of the responses for each work session are stored on the hard drive of the work station computer for students to work with or for instructors' reference at any time during the course.

A personal notepad is also provided for student use. At any time during a work session a student can select a "notepad" button and be taken to a text editor screen where they may make personal observations or comments on any item or note questions for later follow-up. This notepad is considered confidential by the instructors and only the student involved ever looks at his or her notepad. These, too, can be printed and are stored on the system for the duration of the course.

All of the current simulations are set in Pembina Elementary School in the Rutherford School District of Alberta. Rutherford is a fictional community of approximately 55,000 located 30 kilometres south and west of New Inverness, an equally fictional Alberta city of about 600,000. Both the community of Rutherford and the Rutherford School District have been crafted in some detail. For the community, information is available on business and social matters, both in electronic text form and through the orientation video programs which use scenes of a number of north central Alberta communities to create Rutherford. Maps of the area and of the town are available as computer graphics. A complete organizational structure has been created for the School District Office, along with a full policy manual and a budget manual, all of which are available to students electronically through their computer. Also through a video orientation, students meet the superintendent, Richard Jordan, and his deputy, Hal Polykov, in the superintendent's office. Real Alberta settings were also used in this tape to provide an air of authenticity. In the tape students are given an orientation to the district, to the superintendent's priorities, and incidentally meet another district administrator, Lynne Schultz, who is the Assistant Superintendent (Pupil Services).

Pembina Elementary School provides an appropriate setting for the simulations. It is ten years old, and has had only one principal, Jack Evans, since it opened. Students also hear Jack's assessment of the school, the district, and a number of issues in an orientation video program. The program features a tour of the school during which Jack and Stacey meet many of the teachers and support staff members. The electronic files created for the school include a school handbook, the school budget, complete files for the teachers (including their educational history, work experience, and evaluations for the past several years), and files for those students who appear in the various incidents. The computer system offers a further orientation and information device for Pembina which has been termed "the Walkabout." In the Walkabout students are shown a graphic of a blueprint of their school. By pointing with the mouse and clicking on any room students can see a photograph of that room as if they were standing in the doorway looking in. By clicking on a button at the bottom of the screen students can advance to stand in the middle of the room. Using left and right arrows they can move to see the classroom from all directions as if they were turning 360 degrees as they stood in the middle of the room. The rooms are seen as they might be after school has let out in July, with no people in evidence, some litter, and the furniture pushed about.

After the first work session, when Stacey Metzger has been at Pembina for a month or so, and thus, would know more about his or her staff, students are 'reminded' of the teaching styles, personality traits, and professional and social interactions of their teachers and support staff through a series of video staff profiles made available at this point. The design of each vignette has been created in a sequence and style analogous to the short image advertising commercials used in political campaigns. They are carefully crafted to portray certain personality traits and interaction styles. Unlike image advertising, they are not uniformly positive. Each teaching staff profile begins with a vignette of the teacher in her/his classroom interacting with students. It is followed by one to three additional sequences showing how staff members interact with each other and, occasionally, with parents or other community members. In this way the political alliances and clustering of like interests and sympathetic personalities in the school are subtly developed. In order to present as much of this type of information as possible within the limitation of the thirty minutes of video which can be placed on a single constant angular velocity (CAV) videodisc, there are also additional social interaction sequences offered for each staff member using 'cartoon' sequences. These 'cartoon' sequences are made up of a series of still photographs with cartoon-like conversation bubbles creating the brief storyline. Using this method thirty still frames can be put in the same space as one second of motion video. The video portion of each profile of a staff member lasts between 30 seconds and two minutes; the cartoon sequences can last as long as students wish because the student controls the presentation of each cartoon in the sequence.

In addition, students have available to them on-line several reference publications. These include the Alberta School Act, the Child Welfare Act, the Young Offenders Act, and a grade 4 health curriculum which is necessary for one of the work session items. These references can be searched for particular text strings to permit students to find the sections which pertain to individual items more quickly. It had been the intention of the developers to include the Code of Ethics from the Alberta Teachers' Association with these references but it was not possible to obtain the necessary permissions to do so.

The Simulation Course

The simulations, in which each student assumes the role of Stacey Metzger, principal of Pembina Elementary School, are embedded in a three credit graduate course at the University of Alberta. The course is Ed Adm 595: The School Principalship: Seminars and Simulations. It is offered both as a thirteen week offering during the regular session and as a three week course during Spring or Summer special sessions. The outline for the course is attached as Appendix A.

In addition to the simulations themselves, class activities include an initial orientation to the simulations, debriefing seminars after the simulations, and two or three tutorials on topics which emerge as important to students during the course. Students are expected to read about the principalship during the course from a collection of readings, and to undertake an exercise in reflective journaling about the principalship, their reading, the simulations, and other class activities.

The grading for the class is done on a pass/fail basis. This is not imposed on students. They are offered the option of choosing the pass/fail route or the university's nine point grading system for evaluation. Even though many students have a concern for their grade point average and the total number of pass/fail courses they choose, they have always seen the merit of the pass/fail system for this course. The instructor and the development team also prefer this arrangement and believe it to be the best to create the kind of open, trusting, sharing environment which makes the most productive use of their collective experiences as Stacey Metzger, but also as experienced administrators and teachers, each with considerable seasoning as educators.

Not every simulated work session is debriefed in the same way. Beginning with the second work session, students are placed in pairs and they do a portion of the debriefing in these dyads, a procedure we refer to as peer debriefing. The pairs are not chosen randomly, or by student preference. The instructor tries to pair people who should provide some interesting insights for each other. Often this is done through the matching of an experienced administrator with an inexperienced administrator, but other pairings are sometime used as well. After the third work session a more substantial portion of the debriefing is done in this fashion. The advantage to peer debriefing is twofold. First, all students have an opportunity to discuss what they have done on key issues that they identify and get feedback on their ideas. This is not possible in the debriefing seminar where time is limited and only a set number of issues can be addressed and those are chosen by either the instructor or by a straw vote. Secondly, because the interaction is between two people only, more issues can be covered in the available time. As might be imagined, in a seminar of twelve people it is not possible to hear from all students on all issues, given the time constraints.

Most of the students who enrol in this course take it towards the end of their program. The instructors and developers for the course support this. Reflection about this and anecdotal evidence during the time the course has been running has reinforced the idea that students who have completed a number of theory courses tend to perform more strongly in the course. It also obviates any need to try to fit additional tutorials or mini-lectures on theory into a course which is already very busy.

Analyzing and Interpreting the Simulation Environment

In analyzing the success and efficacy of the principalship simulation, there are a number of places one could begin, including an analysis of student learning, an examination of the acceptance of the simulation environment by students, or possibly a look at some of the details of the simulation environment itself. Each might be seen to have advantages, but if students do not accept the simulation environment and exhibit a willingness to enter into the learning activity with trust, energy, and enthusiasm, it is unlikely to work and none of the other elements will matter. Once the acceptance of the simulation environment and its relationship to the experience of working is established, each of the elements of the simulation will be considered in turn. These include the orientation materials, students' work on the simulation problems, the use of the response record, the file system, the reference materials, the staff profiles, the notepad, and other course activities.

Scrutiny, then, will first be directed towards whether students were able to accept the simulation as a work experience from which they might derive useful insights and skills.

Replacing Work Experience with the Experience of a Simulation

The initial assertion, then, is that the great majority of students working with these simulation materials accept this vicarious experience as a successful, but not complete, replacement of real work. This is born out by the observations of students while engaged in the labs, and confirmed in interviews with students and instructors, as well as in student journals. This anecdote from Ingrid's journal humorously encapsulates how real the experience can seem:

> The only way I can describe In-Basket One is a two hour adrenalin rush!! The scariest part -- sitting with the group at 5:45 p.m., not really knowing if I was prepared and seeing that everyone was as nervous as I. The funniest part -- after I hung up from speaking with Enoch Powell a student behind me (*not part of the simulation group*) looked at me and said with awe, "You have a connection from your school to a phone in here? You can get that done?" He really thought I was Stacey Metzger, principal of Pembina Elementary!! Now that was a confidence booster. (Ingrid, Journal)

One instructor put it this way:

> ...for most of the students it can replace work, but we'll always have to accept that there is an element of student decision in that process, and that some students are going to be more disposed than others to make the decision to let the simulation become real work for them. But having said that, I think our experience with the course is that most of the students do make that decision, and I think that speaks to the compelling nature of the materials, and to the very positive intentions of most of the students who take the simulation course. (Instructor Two, Interview)

As suggested here, the acceptance and involvement of the students is not uniform. Some are able to accept this simulation as providing a very large part of the useful experiences that work experience might have. They make a conscious decision to suspend disbelief and to involve themselves as fully as the technology and the design of the materials permit. Maureen, who was a vice-principal and a good student, came to accept the simulation as very real and learned considerably through the experience:

> The first thought was that at no time did I think -- "Stacey messed up. I wouldn't have done that." I, throughout the simulation, took ownership for every action and reaction. This point crystallized for me when I had to defend Tommy's transfer. Although transferring Tommy may well be passing a difficult situation to a different school, given the situation and background, following through on the promise of transfer was the correct decision. (Maureen, Journal)

Angela, a solid but not exceptional student, described her experience this way:

> Yeah, I quite enjoyed it - it was total involvement. I felt like I was really participating in what was going on in the screen and being able to communicate and answering the telephone - it was quite real. I guess a good indication of that is how quickly the time goes by - there are really no distractions there except for what is going on right in front and I didn't think of anything else except what was there - that to me is 100% participation. (Angela, interview)

The parallel of students lives within the simulation with their actual lives as teachers and administrators also seemed to play a role in drawing students into a more total involvement in what they were doing. Elaine, a department level administrator in a high school and a very experienced teacher, made the following comment about the simulation experience:

> In part, yes - I'm very challenged by it, I don't notice the time go by at all, I'm not clock watching at all, I'm involved the whole time I'm doing it. Again, I'm a competitive person, so I suppose there is that end to it too, there is an adrenaline rush and you want to do your best, and you want to get it done. So from those kind of points of view it is real. (Elaine, interview)

This becomes all the more compelling when you consider the additional comment Elaine made about how the reality of her life became confused with the simulation in dealing with one item. She described her feelings and her reaction when a large, rough, dishevelled man burst into her video office as the opening sequence of an interrupt:

> But I have just been going through that with one of my own staff members, and I just thought no, call the cops. And if I had a gun, I probably would have shot the man, but that's how strongly I'm involved with that incident at the moment, and it's quite a personal - it was a personal uncontrolled reaction...
>
> But I was reacting, absolutely, and in real life I was seething inside because one of the things that I have had to live with for three weeks is knowing that the man, whom I'm counselling the wife of, trying to hold her together for the situation - and one of the things I have to be worried about is this man getting ticked off and coming after me.... I'm the enemy, and the counsellors made me aware of the fact that there is a danger there, the man might come after me. So I froze. This was quite real, and I didn't realize how much I'd been living with that until that thing came on the screen. (Elaine, interview)

Elaine's reaction, while particularly dramatic, is not atypical. Consider these comments from Leslie, Angela, and Maureen:

> That Peter Pan incident actually happened in our school last year. They are very real. (Leslie, interview)
>
> I kind of put the ball back in his court in terms of my supervision for his children after hours, or else, perhaps, he should invite his child to stay at home. It was just kind of funny because it reminded me of several parents I had dealt with. It was realistic and I just took a moment to ponder on that, I guess, and to see the humour in it. (Angela, interview)
>
> The second thought that came to mind was that of the 75^{+} critical incidents I dealt with, I could draw on my limited experience as a junior administrator for almost all of the situations. It was a realization that my school was like Pembina -- not in a limited way, but almost completely -- the staff was the exception. What did I learn from this realization? That baptism by fire is not the best way to learn administrative ropes. The simulation has given me a catalogue of responses from which to draw compromises and solutions for my work situation. (Maureen, Journal)

Students would regularly suggest they had dealt with a similar case, or that they knew who the model for a certain problem had been, because they knew someone who had been in the identical circumstances. None of these students who claimed to know the source was ever correct, but the fact that they thought they knew, that they identified with it as being real within their experience, helped them to accept the reality of the simulation and to participate in it in a more complete fashion.

As Instructor Two made clear above, not all students could get past their psychological blocks or fear of computers to make a personal commitment to involve themselves with the simulation. From among the few students who had difficulty, Rita's feeling in trying to deal with her first simulation, and Glenda's concern with the distance of the simulation from reality, provide good examples:

> I was kind of the person at the firing range and these things were being fired at me. So, as far as actually being a person dealing with these items, I wasn't. I was kind of a robot, an ineffective one, because, by half way through I was, as I said to you afterwards -- I had gotten a migraine, and I was basically just sort of stumbling down a dark corridor and without much direction, and I really wasn't feeling that -- you know, I'm interacting with any of these items. I was just being hit by them, and reacting rather than interacting. (Rita, Interview)

> The concept of [*experiential*] learning is fascinating. When I consider and experience the initial stages of the course I have a feeling that this type of learning is close to be [*sic*] realistic, but not absolutely realistic which makes me wonder how genuine the decisions would be. There will certainly be. I only wonder what kind of responses I will make under the circumstances. The actors in the video seen unatural [*sic*] in a way -- amateurish. They are hilarious when they give out so much information all at once. (Glenda, Journal)

While students such as Rita and Glenda were a small minority, they pose a concern and a challenge in using simulation methods. The course developers' goal is to have all students undergo successful learning experiences in their course work, and to find ways which allow students who are not predisposed to make the decision to participate fully in the simulation, make that decision, and become involved with the simulation materials. This continues to be a challenge and a matter for study.

One theoretical position on the psychology of learning which is relevant here is that of situated cognition, or situated learning (Brown, Collins, & Duguid, 1989; Brown & Duguid, 1993; Choi & Hannafin, 1995; Lave & Wenger, 1991). This perspective emphasizes the importance of contextual and situational factors in learning. From within this perspective Brown and Duguid (1993) have speculated that it may well be possible to design a technological environment that can replace the normal social situation of work. Their suggested approach is very similar to that which has been designed into the principalship simulation. Brown and Duguid describe a technologically based situated learning environment as follows:

> To relate this again to the design of technology for learning, it seems important not simply to fragment or decompose tasks to make them didactically tractable on their own and for individuals. Any decomposition of the task must be done with an eye not to the task or the user in isolation, but to the learner's need to situate the decomposed task in the context of the overall social practise. The presence of the full context give the learner the change to "steal" whatever he or she finds most appropriate. It is vitally important not to fragment the social periphery. One of the missions of technological design should be to provide the glue for this social periphery -- and to design with an eye both to using the social periphery, and, where possible, to enhancing it. (p. 12)

From a different perspective, theoreticians and designers of simulations talk about the reality of simulations, and the consequent involvement and acceptance by participants, in terms of validity and fidelity (see, for example, Alessi, 1987; Millar, 1984; Ruben & Lederman, 1982). In this context, validity is the extent to which the problems presented in the simulation are perceived to be identical with actual problems in the real world. Fidelity is the degree to which the presentation of simulation problems, and the activities engaged in while addressing these problems, completely match the same experiences in the real world. A simple example here would be that of a flight simulator. A simple microcomputer based flight simulator may use crude representations of airplane instruments and blocky drawings of the scenes through the cockpit window, where a flight simulator used by an airline may use real instruments in a cockpit mock up, together with photographically real images of the scenes outside the cockpit and a system of physically moving the simulator to give the feelings of movement the airplane would have. While both these simulators may behave as an airplane would in certain manoeuvres and "attitudes," and thus both be said to have high validity, the microcomputer simulator would be said to have much lower fidelity than the airline simulator. Of the two, validity seems to be by far the more important to the students working with these simulations. This is just as well because the technology available for this purpose, while engrossing enough for most students who are motivated to suspend disbelief and participate in the course, is considerably short of what a totally real simulation, after the futuristic fashion of the three dimensional, live action holograms of the "holodeck" in the television program *Star Trek: The Next Generation*, would be.

The importance of validity and students' recognition and acceptance of validity in the simulated situations would seem to be a critical element in the simulations and in establishing the context for learning. Another student, Susan, perhaps summarized it best, verbalizing what other students have also suggested:

> Oohh - very important, because then you realize you are dealing with a situation that could happen to you, so it makes it that much more real life simulating. If, for example, I've never dealt with, or in the school I'm in we've never had the situation with the girls being enticed by a car, and if I thought that that might -- you know -- if I thought that it wasn't a real life situation and then I may think, it won't matter what I answer 'cause this doesn't really happen. So I think it is very important that they are situations that have actually happened. (Susan, Interview)

The issue of fidelity is considerably more problematic. While many students find the simulated work sessions involving and real, as has been shown, there are some intriguing observations to be made about the need for total fidelity and some cautions with regard to how quickly technical glitches can derail the fragile mental commitment students make to the simulated world.

Perhaps the most intriguing finding is how accepting students were of the level of fidelity the project has achieved. While they could (and did) make some suggestions for improvement, the general reaction of students paralleled the affirmations of Gene:

> No, I think it is pretty good actually - the responses you got from the kids - when you went in and interviewed some kids - that is pretty difficult - No, I think it is pretty good...
>
> ...no, I don't know enough about computer programs to say how you can improve it but I think I had mentioned earlier that I was kind of intrigued by the course - I'm really impressed with the simulations - to be able to walk around your school, point a mouse and look in a room to see the people - I think it is really good. I think the only place there could be a slight improvement could be the second batch of staff profiles or interactions - these balloons with the writing inside of them - if they spoke rather than doing that it would be a bit more realistic. (Gene, interview)

Gene's suggestion of more use of video for information and problem presentations is a theme which emerges again and again (together with telephone interactions) as the most consistent place where students would like additional material, even though they generally find the material realistic and involving. Recalling that problems and information are presented primarily through text and video, with three telephone calls in each session, and that there is a preponderance of text rather than video throughout this simulation, this suggestion may reflect both a recognition of how much of a principal's work is done through personal interactions with people, and the inclination to increase the fidelity of the simulation through the incorporation of more video and telephone interactions.

The production liberties taken with concepts of moving in space and time within the simulation did not seem to bother the students, but the development of a more verbal and visual environment as described above, seemed important in building the illusion of reality. Consider the comments of Elaine and Angela in this regard:

> Those little interludes where they're interacting with each other are excellent and I'm sure they are very difficult and expensive to stage, but I think they are invaluable and in class when we're discussing I find that's what people do remember are the interludes where the two of them are interacting and you can see them actually talking. And if you've worked in a school you know that is real life, that is how -- It's not right and wrong rules and policies, it's how the people interact and get along, or don't get along together....
>
> Some people I would think are more verbal, so they would appreciate a little bit more actual people on the screen, and a little bit more ability to be able to talk or interact with the people on the screen. (Elaine, Interview)
>
> Maybe just less notes and more of the video stuff - of the acting. I think that might be -- or even more phone calls -- those are good, those are really good because you are right at the moment -- it is really handy to have a response in the moment. (Angela, Interview)

Balancing the addition of more video and telephone materials offers a number of challenges as well. Observations of students in the simulations during the period of data gathering has led to an understanding that without the physical presence of another human being, students will sometimes perform other tasks while listening to the video presentation, sometimes missing useful visual cues. For example, Larry offered this explanation when asked why he did not bother with eye contact and just wrote while material was on the screen:

> I do try to maintain eye contact as I write. It's possible the fact this screen is not so realistic that I'm going to look at it while I'm writing.... I don't know if it is an important part of it. I think I gain by writing, and I'm one who has to write to remember. I may never look at it again, but just the fact of writing, whether or not I have eye contact to the screen, or if it was the real person that I could make eye contact, I think the outcome would be very little different. (Larry, Interview)

This shortcoming of the vicarious reality presented through video was also a problem when the student was talking on the telephone and an interruptive crisis occurred. While this did not happen for every student in every lab, there were a large enough number of phone calls and interrupts that it did happen more frequently than the designers anticipated. While the actual physical presence of a person in a "real life" situation demands attention, and the cues from facial expressions and body language are generally thought to contribute to the interpretations made during an interaction, a significant number of students in the simulation were content to rely on the information they received from the timbre and inflection in the voice of the video person, regardless of how intense, agitated, or threatening the image may have been. With this lack of physical presence in a video interruptive crisis, for example, students were observed to forget any strategies they may have for dealing with conflicting demands for their attention in interpersonal communications situations. Asking the caller to wait a moment did not seem to occur to them. Some students simply ignored the video in this circumstance, others became quite confused. Gene described his experience of coping with the two competing communications in this way:

> I didn't know how to get him off the phone and I guess I didn't realize I could tell him, "Look I've got an emergency, goodbye --", and that's what I guess I would have really done, but I didn't know that I was able to do that. Then I thought, "Gee, that's what I've got to do. So then I did but in the interim I had kind of missed the first part of it. (Gene, Interview)

It is these sorts of problems which make the provision of significant amounts of additional video and the method of its integration a matter for reflection. Any augmentation should be done in a way which increases fidelity and involvement, not in a way which allows simulation elements to collide or conflict and thus diminish the power of the simulation by revealing the absence of the complex and instantly adaptive cues presented to one person by the physical presence of another.

For the most part the technical aspects of the computer workstations worked well, but occasionally a station would crash while a student was attempting to begin their work, or even more occasionally it would crash while the students were working. The instructors and designers hoped that most students would respond in these moments of system failure and time delays as did Elaine when her computer crashed as she began work:

> Well, it had happened before so, again, I don't get rattled by machinery. I'm a teacher and I deal with AV all day long and I'm also a department

> head of English teachers who are not good machine users, so if there is a problem I tend to do my rounds down the hall and help with film projectors, tape recorders and vcr's. So I look at machines as functional and when they don't work, I don't get upset about it, I know they will eventually work. (Elaine, interview)

With a very few of the students, however, their reaction is far more traumatic and their mental fabrication of what other students are doing while the crashed student waits for their machine to be started by the instructor or a lab assistant can be quite daunting and can interfere very seriously with the student's ability to accept the simulation once the computer is working again. For example, Rita described her experience this way:

> And maybe because I didn't have experience, I was unrealistic about what I would face, but in the 20 minutes which it took to get my computer up and running, I had just worked myself into knowing that I wasn't into telling myself, "Hey, I have never done this before." I listen to all these other people typing madly, and arguing on the phone -- I'm just in for it, you know... (Rita, Interview)

It is important to remember at this point that most students responded very positively to the challenge to accept the simulation as a work experience. Even with the dificulties which have been described, it seems that the evidence is persuasive in indicating that the simulation described can replace a work experience for aspects of administrator preparation. Besides the perception of realism through fidelity and validity in the simulated work experience, there is the interesting ancillary question of whether students who are working in a simulated environment find themselves able to organize and undertake their tasks as they would in their real office and school environments. This, too, would contribute to establishing a sense of realism with students.

Working as You Would in an Office

The electronic office afforded to principals in the simulations requires some adjustment on the part of student administrators. Coming from school environments which continue to be largely based on paper records for such things as teacher files, student files, budget details, and policy documents, students must very quickly make the initial adaptation to an electronic record keeping system which they have never seen. For many of the students this is a significant change in mind set and it continues to show up indirectly in comments they make. Initially it was possible for students to print all of the computer file information if they chose. This possibility was removed after almost all students, used to working in a world of paper information, began printing complete sets of all files and reference documents. Even after this none-too-subtle hint that they should use the computer based files, a significant number of the students made their own extensive paper notes from the information in the electronic file and took them to the workstations for the simulation rather than bothering to use the electronic retrieval system. Some thought it was faster, some thought it was easier, some liked to be able to study them at home, and some, like Leslie, were able to be very candid about it:

> It's just a habit. I'm more used to working with paper, so it's what I do. (Leslie, Interview)

Others, like Gene and Larry, constructed more elaborate rationales:

> I don't know. I'm thinking, like, naturally our system is on computers for budget and the schools similarly are, but I'm quite sure that they don't very often pull things off the screen. They get regular printouts. You know -- if they want to find out about any particular item they might, in the back of their mind have $10,000 - they want to know what the figure is, but when it comes down to looking at ways to shave some money, it's

> just a lost easier to look here, then look up there, and look over there than it is to be pushing buttons and getting these little slices. So, a printout, I think, might be a better way to go. (Gene, Interview)
>
> I didn't want to take the amount of time it would take to locate it [*a specific piece of information*].... That is a limitation. There is a lot of information that I think the computer could have on-line faster, instead of having to scroll through and lose where you are. (Larry, Interview)

In any event, the students were not as comfortable with the electronic office as was anticipated by the course designers and as casual assessment led us to believe. Certainly they were able to work well enough with the office in the orientation activities and within the simulations to do the necessary work and to feel strongly about the quality of the learning experience. On the other hand, however, more work in both the design of the electronic office and in the approach to orientation that is taken may be necessary before students feel truly relaxed in this environment. The increasing computerization of school administrative tasks will also lend force to the students' degree of comfort with computers and with the idea of an electronic office. As the electronic office in the simulation more and more closely approximates an environment they are familiar with, students will more easily use the tools and facilities provided.

Another significant dimension of how principals deal with an accumulation of items, built up over two or three days of absence, is to assign priorities to the work. Most students worked with two to four sorting piles in their real environments. Gene's approach was typical:

> No, what I would normally do in my office is: I would quickly read through the whole works and sort it out into piles that had to be dealt with right away and ones that could be postponed a little while and then I guess I would be ranking while I was sorting and, if not physically, I would be

> ranking them mentally, so I would be dealing with the ones that I would have to deal with most quickly. The ones in the other piles, if you want, I would get around to them unless they got bumped out or pre-empted by more important things. (Gene, Interview)

There were, however, a number of exceptions to the approach to priorizing work in students' regular lives, suggesting that the infinite variety of human beings also plays out in their chosen work methods. Consider the preferred approaches of Larry, an experienced school level administrator, Elaine, an experienced department head in a large high school, and Susan, a total novice,:

> I'm going mainly on my beliefs that the secretary has put things in order, I'm taking her at what was told about her and she is knowledgeable, and I have faith that she knows what should be looked at first, and I'm really not thinking any further than that.... My previous school, yes, the secretary pretty well was from the neighbourhood, knew the people very well, and I had a lot of confidence in her. (Larry, Interview)

> The simulation I find very fascinating and I've written this in my journals too, because it does approximate real life, and in real life I think I'm a multi-tasker, I'm a fairly concrete sequential person by choice, but I operate well in a random environment which I am presently in, where you have kids making demands. As a department head of teachers, I have an intercom phone that goes constantly, I'm involved with a lot of other activities within school so I have telephone calls coming, so my day is extremely hectic. So when I get into this situation at night, it's more of the same. I don't feel uncomfortable. If I had my choice in an ideal world I probably would sit down and prioritize my in-basket and my memos, but I know that the real world doesn't work like that.... I have about three offices. Because I've been in the school for 12 years, it's fairly -- I feel comfortable in the terrain, so I have my mail box in the office where I would leave my administrative things that I have to deal with in getting to the mail, or get back to the principal or the vp on. Then I have a little office upstairs that I call the modern language work ground, and I'm also head of French and German. That's where I go to make my phone calls, because not many people go there, so I know I can make five calls uninterrupted in 20 minutes. My English workroom which is down with the English department -- also my classroom. I tend to gather my text book things, and my student things as well -- my student

> assignments, so I have my world very divided up and within my own classroom I have a desk where I have more things and I have a bulletin board in two of those places. So my world with multi-tasking I try and keep fairly separate, because if I don't, if I put it all in one -in-basket, I would lose sight of the priorities, my priorities in my administrative work, my priorities in my classroom work, my priorities in my extra-curricular work, and I have to keep them separate, or I would get lost. (Elaine, Interview)

> Uuhhh, that's probably the type of person I am. If I have a list, I start at the top and it really bothers me to jump all over, or not to complete something before starting something else. So I think that's my personality more than anything else, and that I can't be working on three or four things at the same time. It really -- It really bothers me to have something incomplete. (Susan, Interview)

For those who were used to sorting materials, working with the problems list in the simulations was frustrating on two counts. Not only could they not quickly scan the item and develop a priority listing for it, but among the names of the items, chosen by the design team to reflect the identity of the person sending it, were a great number which were identical or almost identical. The frustration that ensued from this meant that students began to work through the materials in sequence from 1 to 25, and after one or two terms the instructors began to encourage this approach. One of the earlier students in this version of the course, Werner, put it succinctly: "I couldn't do an overview easily, so I didn't try" (Werner, Interview).

It would be fallacious, however, to assume that an inability to scan and priorize was the only reason students worked in sequence. Here again, the lower fidelity of the simulation influenced a few students. Since they were unable to create for themselves an approximation of the real situation of having only a few hours to deal with an abnormally high number of incoming items, some students chose not to make the effort.

They seemed to care little if the most important item in the simulation was at the bottom of the pile. Here's how Angela and Gene rationalized their approaches:

> No, I think if I knew what all the pieces were in there I would probably -- and if I had tomorrow to attend to some of these things as opposed to only 2 1/4 hours -- I would probably rank them differently. But in this case I know that I have so much time and this is what I've got to get done so I just start from the beginning and go.... But the way I look at it, you only have so much time to do it and if I were to leaf through them that already takes a chunk of my time away where I could have maybe solved or worked through four issues, so -- for effective time management in 2 1/4 hours, I'm not sure that is the most effective way to get that done. (Angela, Interview)

> No, it isn't, because that is where the simulation is artificial. Really, there is no point in me picking those off, because if you give me enough time I wouldn't need to pick them off, and if you don't give me enough time, I can't afford to. Whereas, in the real world I do have a problem in that if I have two and one-half hours to go through twenty-four items there might be something in there that is very important and I may have to deal with it come hour three, or I may have to have it done; so the same immediacy. How could you set it up in a simulation? (Gene, Interview)

In summary, while students were prepared to accept the simulation environment as real work to a large extent, they were largely unable to work in that environment as they would in a regular school situation for three reasons. First, they were not familiar with a computerized information and office environment and working within one took considerable mental adjustment for some. Second, the system design precluded an easy examination of items and sorting them on the basis of priority as the majority would have done as a part of their usual administrative style. Third, for the smaller number of students who had difficulty investing any elements of reality in the simulation exercise, the electronic office and information environment, too, became simply another piece of a totally alien experience.

On the whole, then, it seems possible to make the claim that the approach evolved in this development project to creating simulations as a learning environment which seems real enough for students to accept, stacked with problems which students also accept as real, has been quite successful. The researcher would assert that the simulated work experience can function in place of a "real" work experience in models of experiential learning such as those of Kolb and Lewin, described in Chapter 2. These ideas have been blended in creating this learning experience with other ideas of constructivist learning and situated cognition in an effort to describe how complex organizations and human interactions can be portrayed in simulations featuring a rich contextual environment, and how students can use the experience to learn. Such an experience is presented as an alternative or a complement to other learning experiences for administrator preparation, such as internships and administrator shadowing. Simulations offer a unique opportunity for involvement and for the acceptance of administrative responsibility. While internships and shadowing may offer worthwhile experiences, they are not the same, as Rita explained:

> Right. But following someone around is not actually being involved in the decisions. They're still making the decisions, and you're not. You're just sort of watching and seeing the consequences, and all the elements that went into the decision. You're not actually doing it. (Rita, Interview)

It is also easily argued from a contextual point of view that an intern or a shadowing student doesn't see all the political and personality elements which go into a decision, given the limited time they are in the environment and the limited access they have to privileged information, such as personnel files.

Based on the acceptance of the simulation environment by students, a further examination of the elements of the simulation environment and the nature of student learning would seem warranted.

The Computer Interface and System Navigation

In general, the research observations undertaken in this project support a claim that the overall design of the computer interface provided for navigating through the orientation and simulation materials in the Pembina Elementary School simulation is intuitively easy to understand and use. While there are some problems with scrolling within windows and with some details of operation, most of these could be easily corrected and many of them were changed as they were identified. The claim of ease of use and an understandable navigation system has been supported by information obtained in the student interviews. Comments from Susan and Elaine are illustrative:

> The navigating part is very easy, but it could be because I have a lot of computer background from teaching business ed. and that, and I didn't find -- Actually, I thought I had more problem with the mouse than I actually did because I'm not used to using a mouse. But as far as getting in and out and using the different categories, I had no problem with that. (Susan, Interview)

> I think so. It's well set up, and I'm a Mac user. We hadn't used the lab, as I said for a little while so I was a little funny on the buttons at the beginning. But it is very logical and there is more than one way to access which is convenient. It is very user friendly. (Elaine, Interview)

In designing the Project Decide interface, general approaches to good interface design (e.g. Heines, 1984; Kearsley & Halley, 1985) were reviewed and guided the development. The interface design is based on the presentation of a navigation bar occupying approximately the top 20 percent of the screen (Figure 5.3) which is referred to as the 'heads up' bar. The bar is divided into three sections. From the left these are the Mode Select, Choices, and Levels. The Mode Select section contains the primary choices for activity within the system. For whichever mode is selected the Choices box will show the further alternatives related to that mode. The section on the right hand side, the Levels section, tracks the level of the section the user is working on within the system hierarchy. At any time student can return to a previous level by clicking with their mouse on the line in the Levels section which represents the level to which they wish to return.

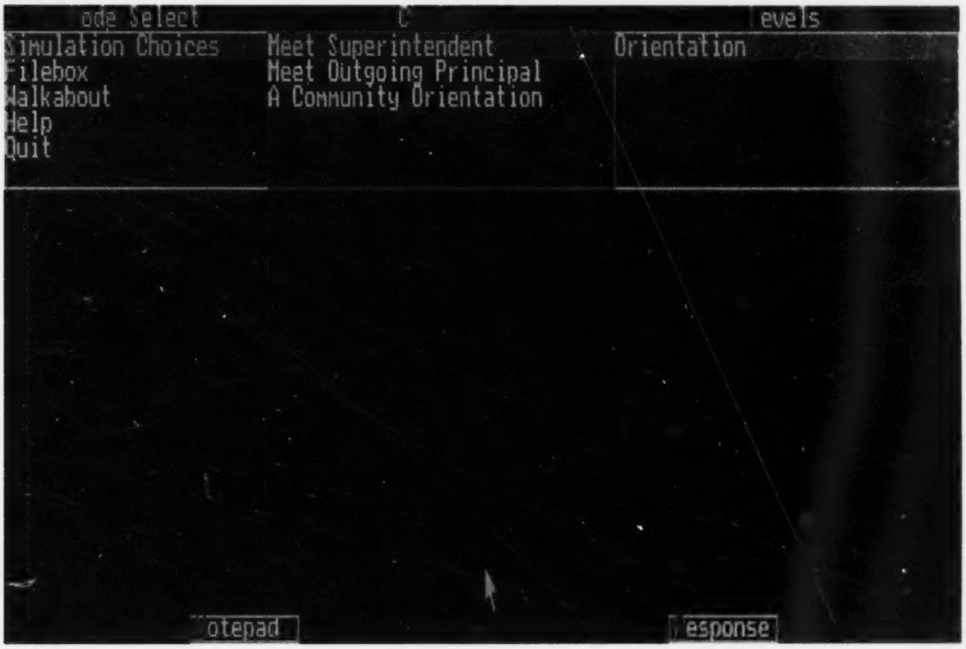
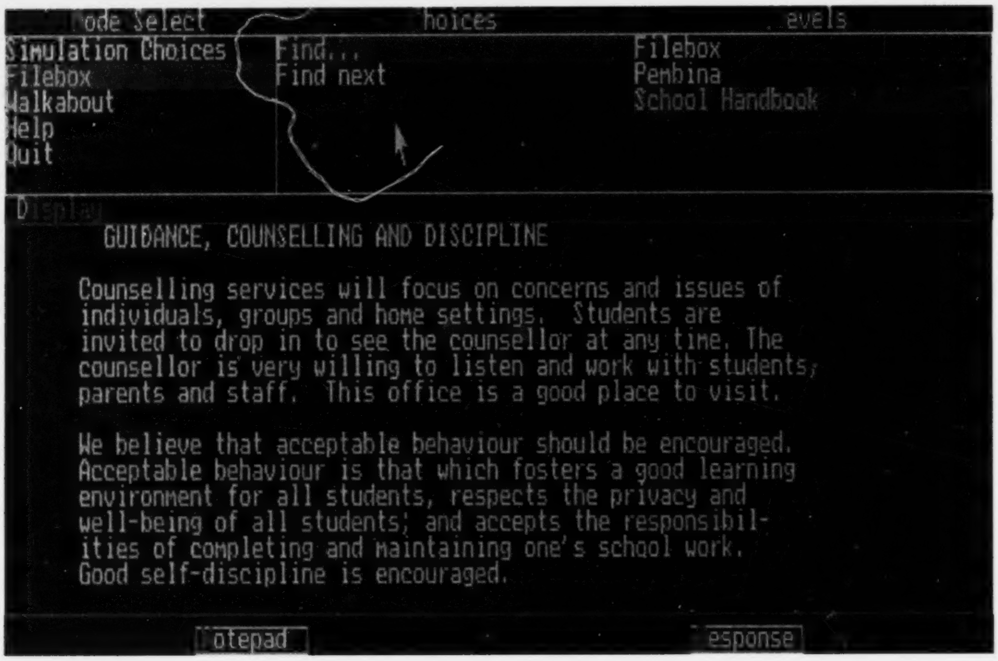

ode Select
C
evels
imulation Choices
ilebox
alkabout
elp
uit
Meet Superintendent
Meet Outgoing Principal
A Community Orientation
Orientation
otepad
esponse

Figure 5.3. The Navigation Bar

When a choice is made from the options in the activity box in the centre section of the heads up bar it will either result in an additional level of choice in a window called up on the screen, or the provision of information on the bottom 80 percent of the screen where the primary displays are made and other work on response records and the notebook takes place. Figure 5.4 illustrates the choice of filebox mode, with a further selection of Pembina (school), and the school handbook. When there are more choices than can be listed in the activity box they are displayed out of sight below the bottom margin of the box and a user must scroll down to them by pointing at the bottom line of the box while pressing the left mouse button. This method is also used for scrolling down to information within any text displays on the screen.



GUIDANCE, COUNSELLING AND DISCIPLINE

Counselling services will focus on concerns and issues of individuals, groups and home settings. Students are invited to drop in to see the counsellor at any time. The counsellor is very willing to listen and work with students, parents and staff. This office is a good place to visit.

We believe that acceptable behaviour should be encouraged. Acceptable behaviour is that which fosters a good learning environment for all students, respects the privacy and well-being of all students; and accepts the responsibilities of completing and maintaining one's school work. Good self-discipline is encouraged.

Figure 5.4. An On-line File Screen Example from the Pembina School Handbook

Where students seemed to have the most difficulty navigating was in scrolling through information in the different boxes and windows, the lack of control over the video sequences in the initial version, and finding information within the on-line reference materials, particularly the acts of legislation. Werner commented very directly regarding the scrolling difficulties he was having:

> Scrolling on the choices box was difficult for me. The narrow band around the line was difficult to hit.... I ended up using the cursor to move in the choices box. I forgot that there were page up/page down keys. (Werner, Interview)

Problems caused by the lack of video controls were identified early and a form of controls had been put in place by the time most of the research interviews were done. Those students who commented on the controls were of two minds. Werner, who really liked the controls, stated: "The video controls were good and I used them all the time" (Werner, Interview). On the other hand, Larry thought they still needed to be improved:

> One thing. When we are watching the disc, a video, you have to go left, or go right, or pause, it's all over the bottom. It would be a lot easier if it was all right there. Move the mouse 1/2", or so, rather than much further. (Larry, Interview)

Probably the single most difficult interface issue for students was accessing and using the reference materials, especially the legislation. Getting to the legislative acts was easily accomplished, but once there the headings within the act were simply given as chapters in numerical order, without any descriptive headings. This meant that students never knew which chapter might contain the information they thought might be useful. The text search and retrieval tool which was built into the program to help find particular phrases and strings proved to be of very little use. This problem will be treated more fully in the section on reference materials. Not being able to use the search and retrieval tool did not help to build student confidence. Some students were able to simply ignore the problem, but for other less confident learners, it combined with other difficulties they were having to make the system an impediment to learning, not a major impediment, except in the case of a few technophobes, but an impediment nonetheless.

The evolution of operating systems for computers beyond the point where DOS was when the interface development portion of this project began in 1989, has made it certain that any interface development for future simulations will be different from the one used for the Pembina simulation. The problems of multiple boxes which are too similar, of scrolling easily through information, and providing smaller controls for computer tools, can be readily dealt with. Designing and programming an improved search and retrieval tool is a larger task, but it is important that it be done to make accessing large text sources something that students would not hesitate to do.

In general, though, the design for the student interface worked well. It was easy for students to understand and to use so their attention could be focussed on the simulation rather than on the computer system. Developing an understanding of how the interface worked and how they would work in the simulations was designed into the orientation materials students encountered during the first class meetings. A great deal of importance was place on providing students a thorough orientation to the setting for the simulation, to the workstation, and to the nature of the simulation activity itself, to ensure a successful learning experience. Further, the strength of the simulation for learning lies with the integration of the simulation with the other activities in the course in which they are embedded. In the next sections we will deal with the student orientation activities and their relation to relevant aspects of the course.

The Orientation Materials

> Well, our orientation materials are so much more sophisticated than any I've ever seen, and I mean in terms of... the person who inspired me to get started on this line of work, Walter Hartrick... I mean I remember the first conversation I had with you. I was hoping that maybe we could develop a slide/tape presentation that might be used as an orientation to the school, and you assured me that, yes, we could, but maybe we could do better than that. And we have done so much better than that. I think our orientation materials are really excellent. I think they are excellent from the point of view of a state of motivation, that is, getting people excited about and interested about -- you know -- a sense of this being a real place with real people, and I'm the leader. I'm the principal of this particular enterprise. I think, from a motivational point of view they're excellent. I think from the point of view of giving insight into the strengths of staff members and their areas of shortcoming... I think they are very good, and sometimes -- it just depends, a little bit, on the skill of the amateur actors that we recruit -- but I think that by and large, we've done a very good job of the orientation materials, especially the video orientation materials. (Instructor One, Interview)

To prepare students for their work in the simulation there are a number of orientation materials with which they work and activities which they undertake. These include the videotapes for meeting the superintendent and the principal, and for learning more about the community of Rutherford. They include all the reference materials in the principal's electronic office. They include a short practice work session, and they include a number of class activities.

The orientation videotapes. During the first meetings the class students begin to assume the role of principal Stacey Metzger by watching three video programs, all shot from the perspective of the viewer as Stacey. Stacey is never seen, and there are no references to Stacey's gender, race, or other attributes in the scripts, permitting any student to visualize themselves in this circumstance. The purpose of the video programs is to provide the incoming principal with both visual and verbal information about the places and people in their school, at central office, and in the community of Rutherford. After some consideration it was decided to produce the videotapes to run in linear form for their entire length, using visual reactions, dialogue style, and rhetorical questions to provide the illusion of interaction, rather than a more fragmented offering managed by the computer in one of several possible ways. This was done in an attempt to provide a more holistic context to the meetings and make it seem more like the viewer was a part of the situation, not letting the constant return to the computer program for another question or selection emphasize the instrumental dimension and influence the illusion. The lengths and approaches to the three video programs are summarized in Table 5.1.

Students' response to the videotapes is positive, but without the superlatives they use for some of the other materials. As Angela put it:

> I think it was relatively useful. It certainly told me who was there; who I was going to be working with; what the community was like -- gave me a chance to work on the computer and use the screen. I think it was very adequate. I felt relatively prepared for the first one -- I was a little nervous not knowing what to expect, but I felt like I sort of knew. (Angela, Interview)

While students saw the information as useful, these videos tended to highlight a shortcoming of orientations for new principals in most school districts. It seemed the artificiality of the video meetings was more blatant to them because, as they describe it, meeting with the superintendent to review district philosophies and thorough briefings from the outgoing principal tend not to happen. Here is how Gene and Larry saw them

Title	Running Time	Synopsis
We Know We Can Count On You, Stacey	7:53 minutes	Stacey talks with the superintendent of the Rutherford School District, Richard Jordan, and his deputy, Hal Polykov. They provide a general overview of education in Rutherford, their approach to managing the system, and their opinion of Pembina school and some of the teachers there. Lynne Schultz, Director of Pupil Personnel, makes a brief appearance.
It's All Yours, Stacey	17:00 minutes	The outgoing principal of Pembina, Jack Evans, describes the situation at the school to Stacey and provides a tour of the premises and grounds, introducing many members of staff. Staff members' personalities are revealed, and some problems are foreshadowed.
I Know You're Going To Like It Here, Stacey	10:40 minutes	Carol Donelli, a friend at the local community cable television station, talks to Stacey about the community of Rutherford, illustrating aspects of community facilities and the social and economic situation with excerpts from the cable station's videotapes.

Table 5.1. Overview of the Orientation Videotapes.

from the point of view of their experiences:

> Nothing strikes me as glaring. I guess if I thought about it I might be able to go through and say: "the superintendent should have said this," or "he didn't need to say that." But there is nothing glaring, and that is the kind of orientation you get. You know, the guy calls you in and -- I'm not saying it is good -- but often the principal talks to you for an hour or so, hits what he sees are the high points and answers any questions you have and he is gone. He probably happy to be gone. (Gene, Interview)

> They are very useful in getting the point across. Unrealistic, because I have never had that happen to me. Any time I have gone to a new

> school, it's sort of like: "Glad you're here. I'm gone. I have left some stuff on the shelf for you to go through." So it was beneficial to have Jack walk me through the building, talk to me about various aspects, although I found myself -- just from hearing what they've had to say about him downtown -- "How much am I really going to accept -- This man's waiting to retire, and I'll do it my way, anyway. (Larry, Interview)

Another aspect, which was raised by one or two students, was being able to ask questions, rather than just hearing the briefing with its use of comments and rhetorical questions to provide the illusion of social interaction. Other students felt that it was unnecessary. Comments by Larry and Susan illustrate the differing points of view:

> I was thinking if there was something where a person could ask a question about the school. In an orientation you'd have that opportunity. I'm thinking about this one piece of information I would have liked and I guess it was in there, somebody found it, but a lot of people said they couldn't. (Larry, Interview)

> But I think in this situation that would be pretty difficult and I think you can get yourself overwhelmed then. And I don't know, in the orientation, if we really know enough that we really need to ask a lot of questions. I think all the information they gave was plenty, because it is overwhelming at first. (Susan, Interview)

Given the vast number of things that students could conceivably ask in this situation and given the overall level of satisfaction with the orientation videotapes expressed by students, leaving the materials in a linear form is likely the preferred course of action. Other simulations observed by the researcher, such as *Regimental Surgeon*, produced for the US Navy (Henderson, 1989), have explored allowing students to ask orientation questions, but the observations made of that program would suggest that there are more risks of having students become disaffected with the simulation in stimulating students to think of all possible questions which might be asked, than there is to answering all of the questions a student is likely to ask and not prompting him or her to think of others.

In-class activities. Much of the orientation endeavour either takes place in class or is stimulated by class activity. The first viewing and discussion of the three video orientations was undertaken as a class group. As a stimulus to independent study of the file and reference materials, one or two in-class verbal quiz sessions are held during a subsequent class. These quizzes are undertaken in a light-hearted vein and are used solely as a self-check for students to see if they know what they feel they need to know as a principal beginning work at an unfamiliar school in a district new to them. A typical question might be: "Who is the only first year teacher at Pembina?" Students reaction to the quiz varied. While most think it helped them concentrate and focus in their study of the file and reference materials, thus preparing them for their 'work' as Stacey Metzger, a significant minority felt it was unnatural and had no relation to how they would prepare for work. For this group, perhaps, the rote memorization and storage and retrieval of many small details was difficult, and they used other working strategies and tricks of organization to compensate. Students who felt the quiz activities were helpful talked about them in ways such as Susan:

> I like the idea of the little test to help to see if we concentrate on the right areas, or just to see -- you know -- knowing the staff and things like that. It sort of helps us to just -- or I found it helped me to see where I needed to bone up a little. (Susan, Interview)

Larry, on the other hand, typified students who did not think the quiz and the preparation for it was worthwhile:

> We took that first time to look at the map of the school and meet the people when I was getting ready for that first quiz. This is unnatural. I

> 'm not that kind that is going to memorize the staff list so I'm sure to know Joe Smith's name when I meet him next time. If I don't remember I'll say, "I'm sorry, I forget your name," and go from there. (Larry, Interview)

However, even though he didn't like it, Larry was willing to grudgingly admit that the quiz and the related class activities might have some value:

> I guess the benefit is, given the simulation, you need to know a lot of stuff, and you need to know it because the last one was how many months down the road? So I tried to put myself in that frame of mind. I got to know them well enough, as if I had worked with these guys for 3 months. (Larry, Interview)

Certainly more important than the quiz and coaching on details needed for role performance was the important idea of students visualizing themselves in a leadership role. Initial readings and discussions were intended to have students think about the kind of school they would like to lead, and what they could do as the principal to shape that vision. This activity did not end with the beginning of the work sessions but was intended to continue throughout the course. This will be discussed more fully in the subsequent section on reading as a course activity.

The practice work session. To give students the basic mechanical skills they needed to navigate with the computer interface for the simulations, to retrieve information they thought was needed from teacher or student files, or elsewhere in the file system, as they went into the timed, high pressure work sessions, a practice work session is used. The practice work session is short, only three work items, but most of the students interviewed seemed to feel it was enough. Here is how Susan and Elaine expressed their thoughts on the utility of the practice work session:

> I found the practice basket a very good exercise in that I was literally terrified in the simulation, and I know it seems silly because it is only a computer, but I was very, very afraid, and having the practice really helped. Even though there was only three items I think that was very nerve wracking. But it was only three items and it didn't count, but I found just going to do that you kind of know what you're up against.... No, I don't think so (*the number of items in the practice session should not be changed*), because you might lose the, umm -- Like, if you get too much practice ahead of time, I think then you have too much time to plan on how to react.... No, I found the three were just fine. (Susan, Interview)

> It was really helpful, very well planned and organized. I don't know, if someone didn't have quite the facility with machinery would feel at ease... There must be people who come in there and feel a little overwhelmed by it all. But I think if you're computer or keyboard literate at all, that it's not a feeling that stays with you.... I think it's a good idea. Absolutely. I think if you threw people into that first simulation with all of those different problems they would probably choke. The having the three items probably took as long as having twenty items, just because people were adjusting to the idea of thinking, of reading the screen, reacting, typing reactions, how to prioritize, and even then I think we still make mistakes. (Elaine, Interview)

Observations by this researcher and by the other instructor/developers would suggest that the practice work session should be extended in the hope that more features of the system which are currently overlooked by many students will become part of their knowledge. Further, certain techniques, like how to handle telephone calls and interruptive crises which occur at the same time, should be made part of this exercise. There were a few student comments made during the interviews which bear out this perception by this researcher and the other developers. Take Leslie's comments on feeling lost regarding system operations during the work sessions, for example:

> Well, maybe it's just not really having done that. I don't know if we even did that in our first session -- I don't recall going from being in a letter space to going into a file, or going into the budget. I don't

> remember. I'm not even sure if I know how to do that so maybe that's just a part of something that could happen in the first class with a little hands-on. (Leslie, Interview)

Gene made a more direct suggestion regarding the integration of handling the collision of interruptive crises with telephone calls:

> We had a session where we ran through three. It might be useful at that time to say, "Look, if you get a phone call...". Or go into more detail, if you could. Interrupt the thing, or interrupt with one of those flashes and say, "Look, this is what's going to happen and this is, kind of, your response...." (Gene, Interview)

Independent study on the system. In addition to the activities in class and the reading and journaling they were doing, students spent significant time working independently on the system, learning about the Rutherford school district and Pembina Elementary school. One of the instructors summarized it this way:

> The file information that people pour through just makes the context much more rich. People really do spend a lot of time in looking at the file material... and that's the file material on the students, on the staff,... the school handbook gets a fair amount of attention. They look at the school budget... I think that just the amount that there is to come to terms with is a strength of the simulation. 'Cause that's a challenge and people taking on their first principalship... they walk into their school and there's so much to know that they can't possibly come to terms with all of it before September 1 when the kids walk in. Our challenge is somewhat similar to that. (Instructor Two, Interview)

The students themselves acknowledged that they had spend significant amounts of time preparing themselves for the work sessions. The feelings expressed by Susan and Elaine were fairly commonly held by other students as well:

> Yes, I think so, because I have spent probably twelve hours in the lab ahead of time, so I wanted to make sure I know the stuff really well. Because I didn't do very well on the test the first week, even though I'd spent all that time, so I went back and spent more time, and I could

> visualize who they were. And I had a list where I had who the strengths were... (Susan, Interview)

> I like the idea of being able to go in there ahead of time and spend as many hours as I feel is necessary to get to know my staff or whatever. And I think, again, that that's real life. Some people don't spend as much time, other people spend a lot of time, and I think in real life that would be the same way, too. Especially if you're hired during the summer. So I like the idea of the access to the carrels ahead of time. (Susan, Interview)

> I did go back and do my checking of certain documents of which I wasn't sure when we first started the whole experience, though. I did make a point of coming in and checking all the policies and I did a lot of note taking at that point because I didn't want to be making decisions out of ignorance, either -- panicked ignorance -- so, I had a lot of notes already done on the school, and the kids, and teachers, and you saw me check occasionally in that little book of notes I had done. (Elaine, Interview)

The time involved in this preparation, when combined with the reading and journaling required in the course, seemed onerous to some students. The course seemed to have developed a reputation not just for quality, but for being tough and time intensive as well. Werner made a terse recommendation in this regard: "Time on the system to learn what is there is critical. Students shouldn't be allowed to take other courses when they are taking this one in summer" (Werner, Interview). Rita made a comment on the same theme in a more expansive and illuminating way:

> I don't know how teachers that are teaching in the schools can take this as a night course. I think it would be very difficult. I know I'm spending a lot more than 1/5 of my time on it, but that might be because of my -- you know -- where I'm staring from. But I see these teachers rushing in, and thinking, I know what it's like to teach all day, and I can't imagine these extra hours it must take coming down to get exposure to all these things that are on the disk and then journaling and doing the readings.... So basically, this is a very demanding course and that I'm giving it more than its fair shake.... But I said in the very first page of my journal that I consider courses where you have to give your all, is the ones you learn

> in.... (Rita, Interview)

Having developed an orientation both to the learning system and to their community and school, students began work on the simulation problems in the timed simulation work session.

The Simulation Work Sessions

The introductory briefings. Each of the work sessions begins with a briefing from the school secretary, Madge MacDonald, and the Assistant Principal, Martin Iwaniuk. Between the two of them they provide students with essential information on what has been happening in the school during Stacey's absence. Figure 5.5 provides an example of the script for one of the briefings to illustrate the sort of information which is presented. The example provides two excerpts from the script for the video briefing for work session 2, the first showing the sort of thing the school secretary, Madge MacDonald, might raise, and the second illustrating the issues raised by the assistant principal, Martin Iwaniuk.

In addition to cueing students to important items to which they should be alert, the briefing is also used as a method of providing additional information about some of those items. This technique has been a successful one. Elaine exhibits a good understanding of how these worked:

> What I like though is at the beginning of each of those in-baskets, there's that briefing by magic Martin because you've been out of the school, and I find there is a tremendous amount of information and foreshadowing that comes there. So I make notes on that, so if there is a telephone interrupt , I know what is coming, I'm not shocked by it at all. (Elaine, Interview)

Excerpt 1 from Video Briefing for Work Session 2

MCU Madge, seated at her desk in the general office	**Madge:** It's been a real zoo again while you've been gone. (ruefully) We Should never let you leave the school. You'll find some really curious things in your in-basket today. One of them is a message from Dr. Short... you know, Stephen's dad from the college. I don't know what has him so upset, but he wouldn't talk to Martin, or to anyone else. He wanted to talk to you! He's promised to call back today. Also, Lorraine Flemming dropped in to see you yesterday. She wanted your advice about Margaret, who is in grade three this year...

Excerpt 2 from Video Briefing for Work Session 2

MS Martin	**Martin:** Anyway, I've left you notes on most of this stuff but I thought I'd like to make sure a couple of them didn't get lost. We had trouble with Greg Tarling from Fluff's grade 2 class this morning. Connie caught him fighting with Doug Tims in the hallway and when she tried to break it up, he went into a full force tantrum. It took both Fluff and Connie to haul him down here, and he was even trying to bite Fluff's arm. It's probably something to do with his medication but if it happens again someone could get hurt....

Figure 5.5. Script Excerpts from Video Briefings.

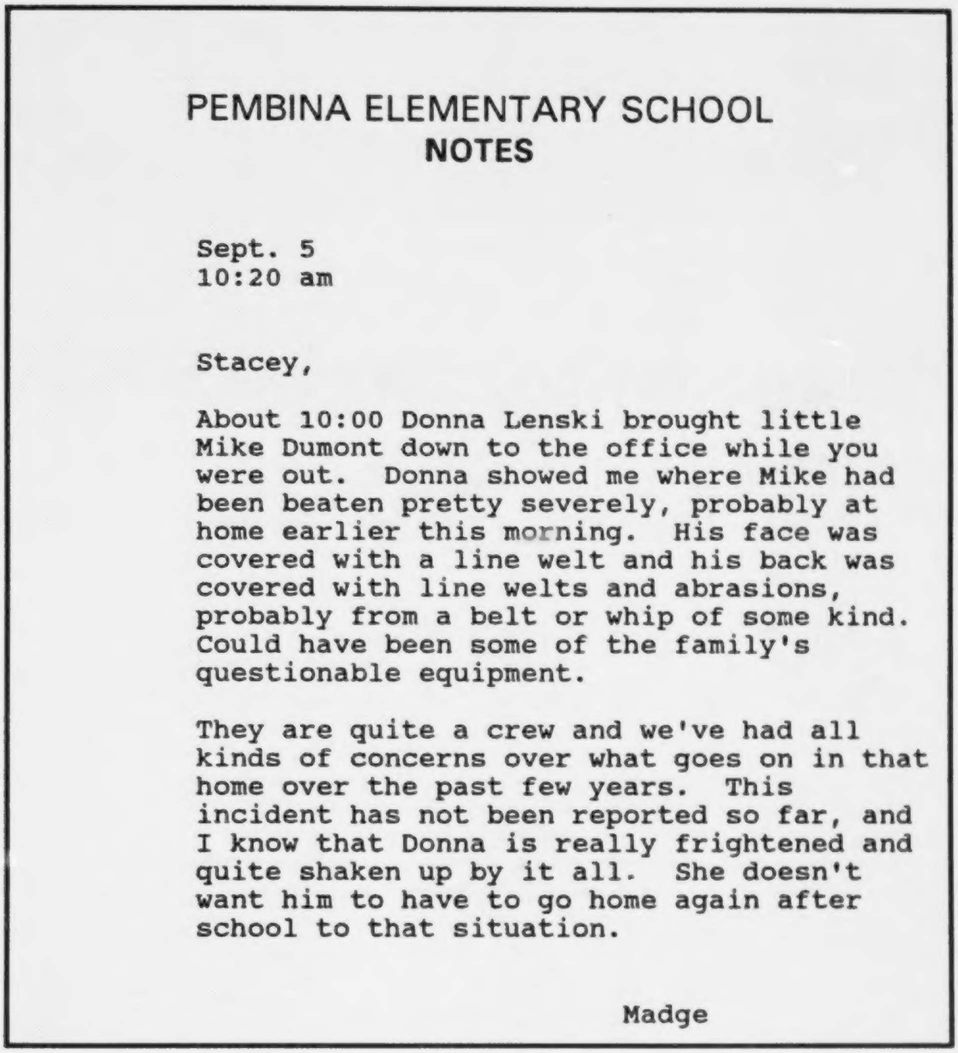
When the briefing ends students have the option to repeat it or continue on into the work session. By this time students are usually in the grip of an "adrenalin rush," anticipating the session, and go immediately on.

The presentation of problems. Problem situations are presented to students in one of three ways: as text items, as video items, or as interruptive crises. Three of these items are augmented in each work session by a telephone call. The interruptive crises and telephone calls will be dealt with in the following two sections. In this one, the presentation of the text and video items, with the text attachments and memory flashes, will be considered.

The use of text items in combination with video items (to emulate face to face communication) seemed to work well as the major method of presenting problems. Figure 5.6 presents an example of a text based item and Figure 5.7 presents an example of the script for a video based item. The problems themselves were known by students to be taken from real life incidents at schools in northern Alberta. The students were sufficiently engrossed by the way these problems were presented, as well as by the problems themselves, to have time slip rapidly by them in the work sessions, as we have seen. These chosen presentation methods worked well, although students have suggested that a higher ratio of in-person 'video visit' items to text items would be more representative of a school environment. The positive impact of the video is well characterized by Elaine:

> The video dimension creates an aura of reality that allows for that extra 'pump of adrenaline'. I see why simulations in various situations are effective. Great stuff. (Elaine, Journal, January 1992)

In both types of presentation there is the possibility of providing students with additional information either in text form or in video form through "memory flashes." Both of these are simply called attachments and were presented to the students in the centre choice box



PEMBINA ELEMENTARY SCHOOL
NOTES

Sept. 5
10:20 am

Stacey,

About 10:00 Donna Lenski brought little Mike Dumont down to the office while you were out. Donna showed me where Mike had been beaten pretty severely, probably at home earlier this morning. His face was covered with a line welt and his back was covered with line welts and abrasions, probably from a belt or whip of some kind. Could have been some of the family's questionable equipment.

They are quite a crew and we've had all kinds of concerns over what goes on in that home over the past few years. This incident has not been reported so far, and I know that Donna is really frightened and quite shaken up by it all. She doesn't want him to have to go home again after school to that situation.

Madge

Figure 5.6. Text Item Example: Item 10 From Work Session 1

in the "heads up" navigation display. If the students used their mouse to select a text document, an additional letter, report, idea paper, or some other form of text material was displayed. If they selected a memory flash a video sequence was displayed "reminding" them of something they would have seen and heard. An example of a portion of a memory flash of something the head custodian, Antonio Alvarez, said to

The Supervision Shirker

Fade up	Fade up
WS Coffee Room, empty except for Helen Wilder, who approaches Stacey looking around to make certain no one is nearby.	ENVIRONMENTAL SOUND **Helen:** (nervously insistent) Stacey, I must talk to you for a moment. I don't want to be a busybody, but my nerves won't take much more.
MCU Helen	**Helen:** Donna Lenski simply has to take her responsibility for supervision more seriously. She's forgotten recess duty more than once and I just can't do the job by myself. She doesn't seem to realize her legal obligation for supervision at school. It's not fair for her not to pull her share... and then for her to make snippy remarks on top of it all is (breaks off breathing deeply)
MS Helen looking at camera as she turns and moves away.	Helen: Stacey, we had a fight today and I'm Not speaking to her... You'll have to.
Fade out	Fade out

Figure 5.7. Video Item Example: Script for Item 9 in Work Session 2

Stacey Metzger is illustrated in script form in Figure 5.8. This memory flash was made available to supplement a text note complaining about another custodian, Fred Beals, which Antonio has sent to Stacey as a part of work session one.

Students found value in both the text attachments and the memory flashes, although some students initially had trouble remembering there were attachments to notes or remembering to look for them. The video 'memory flashes' are seen to have

MS Antonio standing in the door of the general office.	**Antonio:** Stacey, I came to school yesterday morning and found that Fred had left the classroom garbage cans out in the hallway. He know's he's supposed to put them back in each room after they're dumped. I had to do it while I did my morning checks. It's no good (appears upset and shakes his head in frustration)
MCU Antonio:	**Antonio (continues):** When Fred came in yesterday I said to him, "Why didn't you put the garbage cans away." He just laughed at me and took off down the hall. This happened once in June, too. Fred's a good worker most of the time. I try to get along with him, but he seems like he's mad at me all the time...

Figure 5.8. Excerpt from a Memory Flash Attached to Work Session Item 1:15

considerable value in realistically expanding the dimensions of a problem. Susan put it this way:

> Ooh, I like it [*memory flashes*]... like, our first step was to talk to bothsides, and you actually have done that, so then you can make better decisions, because now you've gone one step further. Now the first step you would do is talk to both sides and get their opinions on how it happened and then you'd have to go from there. Well, that [*the memory flashes*] kind of intercedes there. You have that already.... I found that quite useful. (Susan, Interview)

The methods of presenting the problems and managing their presentation are not without difficulties, however. The three difficulties in this area which seemed to be most apparent to students were the confusion brought on by having so many items labelled simply 'MacDonald note'; the confounding which results from having two almost identical boxes with asterisks on items, one showing which items had been viewed and the other showing which items had been printed; and lastly, the uncertainty and eye strain resulting from student's difficulty in making out the fuzzy writing on some of the notes embedded as single frame television images on the videodiscs.

As previously described, the items in the work session had been given labels based on the name of the person who was originating the communication, which seemed justifiable, as that should have been one cue to the possible priority and importance of the item. As it turned out, because we had used the secretary, Madge MacDonald, as a communications coordinator for the principal, receiving phone messages and conveying ancillary information with letters and documents, a majority of the items in the in-basket each day were simply labelled: 'MacDonald Note'. It is obvious that the result of this was for students to be unable to differentiate one item from another in many cases, except by the item number.

The confusion students were having with the two different list boxes with the lists of items viewed and items printed was clear from the observations of students working in the simulations. In fact, early in the work sessions it should not have been difficult to differentiate one box from another because the second box had very few items in it. However, one conjectures that the similarity in the size and background colour of the boxes, and the similarity of their position on the screen, made them too difficult for students to distinguish easily. Later in each work session, when the second box had filled with most of the items from the first list and a good deal of printing had taken place, the two lists became almost identical and only by knowing which list had been chosen could students discern what they were dealing with. The confusion students experienced in dealing with these list boxes was complete enough to extend to their descriptions of what they were doing. Consider, for example, how Susan and Larry described this:

> No! I just figured out that once you had done something with the MacDonald note or whatever, there was a star there... and a couple of times I'd had two of them on the inside page -- the response record -- and so I'd go into it to see if I'd maybe forgotten to do something with it and I wasn't sure why it was there. Now afterwards I thought that it must be just because I decided to look at it again, so it put itself up a second time on the inside... but it wasn't a big problem. (Susan, Interview)

> Actually, I don't know if it's the numbering so much as some way of identifying it. Like I know after it's printed there is an asterisk beside it. Before it is, and that one time I went back up... because I had missed one... the little screen that comes up on the top of the right hand corner, the number was different than the one that I had remembered earlier. (Larry, Interview)

The last difficulty was that of making out the fuzzy representations of some notes and other text material presented on the screen from the videodisc, and the eyestrain which was reported by some students. At the time the interactive computer-videodisc version of the program was developed there were serious limitations to the numbers of screen fonts which were available directly from the computer for displaying materials. Also at that time the kinds of graphics which could be drawn for the screen were restricted in their appearance of realism by the screen resolution (EGA, 480 x 320) and by the palette of 16 colours which were possible on the system. In wanting to present high fidelity textual materials as well as visual materials, the developers decided to use images of text materials on videodisc to display the kinds of brief hand written, even scribbled, notes that principals get from teachers. When the communication was from central office or an external organization, the document was to have the kind of cachet and authority which a letterhead lends. This approach worked quite well for the most part, but some images in some handwritings, did not resolve well in video, resulting in some images which were fuzzy and hard to read. Susan described her experience with these notes in this fashion:

> I found, sometimes, the notes hard to read, myself.... Now I don't know, that maybe a problem with just being able to put them on the television.. .. A couple of notes were hard to read some of the words, but overall you got the gist of what they were saying and I didn't have a problem with that. (Susan, Interview)

These problems were not insurmountable, nor even seriously detrimental, given the context of the entire simulation and students' general response to it, as Susan's closing remark shows. Improvements in computer technology, in screen resolutions, in system colour palettes,and in screen design tools, would now make it very possible to make the types of changes which would eliminate these problems.

Interactive Interruptive Crisis Items. The interruptive crisis items definitely added to the verisimilitude of the simulation. In each of the work sessions students would receive video visits from two unexpected visitors via interruptive crises. This was done by programming, using the system clock to trigger the interrupt video sequence and subsequent computer menus and video responses. Most of the interruptive crises items used the tracking and branching capabilities of the computer to present further choices of action after the initial video presentation. This allowed the investigation of problems, particularly situations such as fights which add a certain amount of drama (desirable or not) to school life. The number of branching choices varied in each interrupt depending on the nature of the problem presented. Two of them provided no follow on choices at all. While the use of an interrupt was deemed essential in these cases, the approaches to the problem and the choices of response were seen to be potentially very varied given the differences amonst administrators in areas such as values and management styles. In these two cases students dealt with the items through the response record, as they did with all of the non-interruptive items. The script for one of these single video sequence interrupts is provided in Figure 5.9 as an example of type of material presented as an interrupt.

On the one hand these interruptive crises were perceived as being very realistic, as Leslie and Elaine observed:

> I thought they were [*real and involving*]. This whole thing has reminded me of me and my principal. All of these people come barging into your office all the time. I know I do that with him, and I didn't use to think about all the work he had to do. I'm going to try to be more considerate of his time this fall and try to solve more of my problems myself. (Leslie, Interview)
>
> The interrupt is very effective in the in-basket simulation. I feel that's very real worldish. You think your day is going to go like this, and you have two or three human crises, and all those other things -- the paperwork -- gets pushed out of your mind immediately. You deal with the human problems before the paper problems. (Elaine, Interview)

They also added an element of challenge and fun for the students, helping with the process of involving them in the simulation. Gene talked about the attraction of the interruptive crisis items this way:

> Yes. I like that. I would say it's better. I think in the simulation you are going to run into -- and if you came back to the office most of the stuff

Script for Item 19 in Work Session 3

Fade up	Fade up
MS Carl Schwartz storming into Stacey's office. He is huge, his voice very loud, and his manner very threatening.	ENVIRONMENTAL SOUND **Carl:** I want to know where my wife is... right now! She's been gone for too long and they told me she'd come over to the school. Nobody's going anywhere until I find out what you did with her!... Understand me?... Where is she?... Where did you send her?... (pauses and paces back and forth for a few seconds)...
Carl advances toward camera	
MCU Carl	**Carl:** I can't figue out why you guys had to get mixed up in this! Don'tcha have anything better to do?... You better tell me where she is before I'm forced to do something I don't want to. You tell me where she is... right now!
MS Carl standing between the camera and the door, looking and acting threatening.	
Fade up	Fade up

Figure 5.9. Interruptive Crisis Item Example

> would be sitting there in paper form, but I like it better because it is more visual, and I like dealing with those kind of things better. (Gene, Interview)

While the students responded very positively to this feature of the simulation, they also felt it should be extended to allow them to do more of the kind of investigating they would like to have done, concomitantly improving the realism and fidelity of the experience. This desire to undertake additional investigations and the frustrations felt when they couldn't pursue the issues as far as they would have liked is clearly shown in the student responses. Angela described her response to the answers given by one of the students, Tyrone, during her investigation of one incident:

> Well, they [*the answers*] weren't really that informative and the answers were so brief and non-descriptive -- it was almost a little frustrating -- it's like, this is just wasting my time... I suppose somewhere I would have [*asked questions like those offered on the screen*], but I would have done a lot more prompting and tried to get more of the picture: where they were coming from; what this was all about; how it got started; maybe more about the other boys -- That sort of thing. I think I would have wanted to get more information about around the whole picture. (Angela, Interview)

Larry described how one interrupt was limiting for him in terms of the information he could glean, but how another one was satisfactory in terms of information, but its artificiality showed in another way:

> Yes, I found that was limited. There is only so much there, and I realized that I would be more interrogative, probably. (Larry, Interview)

> I was comfortable with the choices given having just gone through an assault case. It's still a nightmare. It is still going on. I was probably more comfortable than I would have been if I hadn't had that experience. I normally wouldn't have bothered to address it in the middle of a teaching session -- go during a break or something -- but because of the nature of the in-basket my choice was to go talk to him. (Larry, Interview)

These students' observations highlight a very real problem, a problem in terms of technical limitations of the system, in terms of the amount of time students will spend investigating one item, and choices about the amount of development time it is reasonable to spend fleshing out an individual interrupt. The technical limitations involved here largely involve the amount of storage space available on a single videodisc. Given the design decision to set up each work session so that students do not have to change videodiscs during a simulation, and given decisions about other materials, most notably the staff profiles, which should be present during the work sessions, videodisc space had to be watched carefully.

The other two elements, the time students will spend on a given item, and the amount of development time to be devoted to individual items, are more directly traceable to value judgements made by the development team. This student feedback has definitely influenced the judgements made by the team with regard to how future simulations will be designed.

Student reaction to the telephone calls. Perhaps the feature of the simulations to which student responded most positively was the real time telephone calls in which each student/principal had to engage three times in each work session. The calls were made to the various Stacey Metzgers by staff in the Faculty of Education, former students in the course, and other graduate and undergraduate students, most of whom were interested in helping with this novel teaching methodology. Some returned to play the same role again and again. Some would take differing roles each time.

The roles for the phone callers were carefully matched with work session items, but it was not always the primary character in the item who called. It was, however, always someone who could annoy or irritate Stacey, cause she or he to waste time, or cause the new principal of Pembina elementary to undertake an unwarranted course of action. For example, in the first work session there is a telephone call associated with an interrupt item, an item where Stacey learns of an attempt to lure two young girls into a car as they walk to school. The caller in this instance is a reporter, Jan Kent. The caller is charged with trying to have the new principal divulge information about the girls and their family which he should not, as well as talking to Stacey for as long as possible. The role players who take on the telephone calling are given a description of their character along with some goals for their call and a copy of the information item given to the principal, if that is a text item. Figure 5.10 illustrates the type of information given to each caller. At the end of the call the caller completes a rating form for each student/principal (see Appendix "D"). The callers are asked undertake their ratings not as experts in handling difficult phone calls, which they are not, but as the person in the role. These completed forms are given to the students during the first full debriefing class after the simulation and during the course they will receive nine different assessments of how well they handle telephone callers.

The enthusiasm of Angela, Lisa, and Glenda was typical of student response to the telephone calls. Angela thought she would like to see even more of them: "... or even more phone calls. Those are good. Those are really good because you are right at the moment. It's really handy to have a response in the moment" (Angela, Interview). Lisa wrote about the telephone call interactions in her journal: "I really have to make a comment about the telephone calls. I enjoy them the best, although they can be a little intimidating" (Lisa, Journal). Glenda also wrote about the telephone interactions in her journal after the first work session: "Wow -- the telephone calls were very challenging -- more challenging than I expected. I felt I handled the press not too badly" (Glenda, Journal).

Work Session #1
Telephone Role Play: Jan Kent

Background Information

You are a reporter for the **Rutherford News**. It is early Friday afternoon, September 5, the first week of school. Ten or fifteen minutes ago you received an anonymous telephone tip that two elementary school girls were accosted on their way back to school - Pembina Elementary - by the driver of a car cruising in the vicinity of the school as the children returned from their lunch break. The anonymous caller claimed that he had picked up a radio transmission on the police communication network although you have no way of verifying this.

The caller said that there may be sexual motivation involved. The description given by the caller was that a dark-complexioned person is suspected, perhaps an East Indian.

You know you have story here. There have been several dramatic missing child cases in nearby New Inverness in recent years. The parents of young children in this community are very nervous. There is also some racial uneasiness in Rutherford. This could be dynamite!

You have decided to place a call to the principal of Pemina Elementary, whom you do not know. Neither are you familiar with the school. You want to verify the report and gather as many additional facts as you can from the principal (for example, the names of the girls and their addresses. You want to know what the school has implemented to "street proof" the children attending the school. You would like the cooperation of the school in setting up an interview with the girls. You know that most of these requests are entirely illegitimate and are quite prepared to be rebuffed, but you take the position that it won't hurt to try. Perhaps the principal is naive and inexperienced.

You are persistent but you are also street-wise, hard-nosed and abrasive. If the principal is as street-smart as you are, which you fully expect him/her to be, you will get what information you can and try not to have the principal hang up on you.

Note: **Jan Kent does not make the first phone call until 35 minutes into the simulation.**

Figure 5.10. Example Telephone Role Play Information Sheet

There were also minor problems with the telephone calls. One of them was the problem of interruptive crisis items and telephone calls overlapping with one another, which has been previously described. Given the three telephone calls and two interrupts in each work session, it turned out that the odds were quite good that someone would be on the phone when an interrupt began, or vice versa. Students had some trouble dealing with this, and the usual strategy that someone would use in real life, that is telling one person or the other to hold on, did not seem obvious to them, particulary since it was the telephone caller, often their preferred interaction, that would have to be put on hold. This was exacerbated by the fact that they couldn't pause or repeat the video interruptions, leaving them in some cases without having seen the initial video sequence from the interruptive crisis.

The second problem with the telephone calls is the problem of making calls rather than receiving them. In the simulation materials the published telephone numbers for Rutherford are regular seven digit numbers which begin with the prefix 555. The intercom telephone system used in the project uses two digit numbers, so any time a student is to call someone they are supposedly cued by the provision of a two digit number on a telephone message, or in some other communication. Perhaps this is overly subtle, but many students found it difficult to keep in mind to watch for the two digit numbers. Gene's experience was typical:

> I think when you had mentioned that if it was a two digit number I could call back, then that clicked in. So, really, I don't know if it is a fault of the communication. It is probably something that I heard but didn't pick up because once you said that I remembered there was something to that effect. So I don't know what we can do there. (Gene, Interview)

Another problem with the telephone calls is one of support. Although the telephone calls are very popular with students, they are also require the most logistical support. With twelve students working in the lab and with three calls having to go to each of them, it is not possible for one person playing each of the three parts to make all of the necessary calls. Consequently, two callers were necessary for each of the three roles for each work session, a total of eighteen callers in all. Finding and recruiting eighteen people who are appropriate for the roles each time the course is offered is no small task. The developers have continued to feel that it was an essential thing to do, and with the help of the Instructional Technology Centre in the Faculty of Education it has been possible to find all of the necessary callers for each course offering.

Another more human interference with simulation fidelity was also noted by some students, and it was not something that made the simulation easier. Elaine vocalized something that others alluded to, either in class or in conversation:

> The comment there would be, though, when you have grad level students making these phone calls, particularly grad level students who are well informed on organizational theory or behavioral theory -- a little different than the average parent who would phone. It is much easier to deal with the average parent who would phone. It is much easier to deal with the average parent who would phone because their knowledge of schools, and how schools work, and what you really can do as an administrator are not the same. Can you bluff parents a little easier than grad students? I think you probably can in some cases, although in other cases you probably couldn't reason as much with parents as you can with students who are grads. Some of the callers I found exceptionally rational, when as a parent it wouldn't be like that. Like even Enoch Powell, when I was speaking with him, I thought, "If this were a real fundamentalist parent, they wouldn't be listening to me they would be just be screaming." And I have the experience. I was teaching a story in English Literature where the devil was mentioned, and Beelzebub. The parent was just incensed by this and I was explaining -- in term of evolution -- the whole theme. But the parent phoned up and just hollered for five minutes. (Elaine, Interview)

While this distorted reality somewhat, students did not find it distracted from their learning experience and, as illustrated at the beginning of this section, most students thought the live interaction of the telephone calls was the best feature of the simulation.

However, most items could not be dealt with verbally in real time as could the telephone calls. Other than in the interruptive crisis items where branching techniques are used to extend the initial response they have made on the screen, students were asked to describe their responses using the response record.

Student Use of the Response Record

During each of the three simulations students are required to write responses for each problem item. Central to their making response is the response record tool, the screens for which are shown in Figure 5.1 and 5.2. This tool allows students to set priority and importance ratings for each item and choose one or more methods of communication for taking action. Some students found this process of thinking about the difference between priority and importance, and its relationship to the total number of items and the time available very useful to them. Joyce, a teacher and would be administrator, was one student who wrote about this issue:

> I can verbalize what the difference is between priority and importance. I think I understand the difference between Priority 1, 2, and 3. I understand the criteria for Importance and how it is accumulated weight which determines action. However, having to deal with all of these at once makes me feel like a juggler. This course should give me valuable practice in juggling various decision-making and conflict management criteria. (Joyce, Journal)

Choosing a method of communication takes students to a text editor screen where they are able to sketch the response they wish to make. If the priority they have chosen is to act within the next three hours, they are expected to write the full text of any letters or notes, and fairly complete plans describing what they hope to accomplish in any meetings or telephone calls they propose.

The priority is selected on the basis of how soon the student feels action must be taken. They can choose to act in one of four time frames: in the next three hours; in three to twenty-four hours; in twenty-four to forty-eight hours; or in longer than forty-eight hours. The importance of each item is assigned independently and for some students who are novice administrators the distinction between priority and importance is a valuable thing to learn. In the context of this course, importance is differentiated from priority in terms of the impact it will have on students, staff, or the school. An item of high importance will have a greater impact on one of these three in the short or the long term. For example, both a serious injury to a student and planning with the superintendent are of high importance; however, they do not necessarily have the same priority. An injury to a student must be attended to immediately while planning with the superintendent may involve development of ideas and consultations with staff as the principal works towards a deadline several weeks ahead. This kind of planning item is not considered to be a high priority in the principal's activities. On the other hand some items are of high priority but lower importance. A phone call from a parent with a quotidian concern for their child's progress or behaviour would most often fall into this category. When completing the response record students select either low, medium, or high as the importance of the item.

All student responses for each work session are stored on the system file server for students to work with or instructors to reference at any time during the course.

It is the collective opinion of the instructors and students that the current response record works well, except for the few students who have no keyboarding skills. As instructor two summarized it:

> The response record works very, very well in the course. Again because there is adequate time for orientation to the system.... Certainly there are some students who would love just to have a paper response form because that's what they're comfortable with, but more now I'm getting students who say: "I love it. I'm used to working on computers. This is just fine." (Instructor two, Interview)

As students worked with the various problem items and reflected on their responses, information was available in the principal's electronic office to support them. This information was contained within the filing system, a number of reference materials, and the video profiles of the staff. These support materials are the subject of the next three sections.

Student Use of the File System

Students approached the use of the file system very differently. For some, it was the trove of information the designers had intended it to be. As Elaine described it:

> But it is very well thought out. And the simulation is broad enough but limited enough. It has to be fairly limited because people go home and have a real life and they come in and they deal with the simulation, and yes, it's real life for two hours, but if there were an overwhelming amount of material to learn, then people wouldn't be effective in the simulation, either. So I do find the files, policy books, the kids' cums -- I find that they are brief but they are very to the point. They give you the information that you need. (Elaine, Interview)

For others it was something they could ignore, working on various teacher and student problems with little benefit of the information they might have found. Leslie justified it this way: "No, I didn't [*use the files*]. I didn't feel quite sure of how to find them easily, so I didn't bother. I wanted to get finished" (Leslie, Interview). A different sort of problem, born more of arrogance than anxiety, was seen in how Werner approached the file materials: "I have to confess that I didn't look at them. I know that all these materials were based on the ones at Edmonton Pub, and I know those cold, so I didn't bother looking at them" (Werner, Interview). While Werner's statement was partly true, much of the information in the files was based on policies and documents from jurisdictions smaller than Edmonton Public, and thus a closer match to Rutherford and Pembina. The district policy manual, in particular, was largely based on the manual of a smaller jurisdiction and might have provided Werner with some different frames of reference, had he chosen to examine these policies. As mentioned previously, a good number of students made their own paper copies of the information in the files and referred to these personal paper dossiers when the need arose during a simulation. Students tended to study the material in particular depth during the initial orientation and, to a lesser extent, during the times between work sessions. This would seem to bear out an expectation that administrators have of themselves. Gene and Elaine described it this way:

> Additionally, I attempted to memorize a lot of it which, I think, given the circumstances and the time constraints -- but also for a good administrator, you have to know stuff. You can't be looking thing up. So, I've thrown a bit of effort into that." This was true of all forms of information regarding the community, the school district, general school information including the budget, teacher files, and student files. (Gene, Interview)
>
> That [*reviewing the file materials*] was something I made a point of doing before I ever got into the in-basket though. You want to know your material, and nothing irritates more than an administrator who makes

> decisions, who is not informed, and then you're picking up pieces, or I'm doing something that has been done. (Elaine, Interview)

During the simulations themselves students tended to use their memories and to a lesser extent their paper notes for all file references except student files and one or two teacher files.

There is also a question of the extent to which file information must be provided to support simulations of this type, and whether the file system and the related reference materials need to be as rich and complete as they are in the Pembina simulation. As one instructor put it:

> Maybe my general concern is that we have such a rich, complex database for students to work in, that they, within the confines of a three-credit course, really don't have an opportunity to fully master it. I'm not saying that we have too complex a database, it's just that we have put a ton of effort into creating the contexts and situations for students and probably we don't have the time to fully exploit them. (Instructor one, Interview)

On the other hand, the richness of the context adds legitimacy to the simulations in an almost intangible way, providing a level of security for students, while at the same time serving as a reminder that work is done in the context of legislation, policy, and previous activity. You cannot simply invent things. As Angela and Larry offered these opinions of their value:

> It's really important for me to know because, with the kind of children that I am working with, some of them have been in trouble with the law, or just their general behaviour around the school -- the things that they do -- there are all kinds of legal implications that could happen. It is important for me, I feel, as a teacher and someone dealing with kids and parents and all that, to know what is in there. So, they are useful. I wouldn't pull them up on the screen [*during a simulation*] -- whether you use them or not, it is just the idea that they are there. It is really, I think, an important model. (Angela, Interview)

> Like I say, I don't use them that much. But the first time I was in I did look and see what was there and browsed through some of it. I think it is important to have it there. (Larry, Interview)

Another student, Werner (who did not consult the files and reference materials anyway), saw a different advantage to creating an environment rich with information -- the chance to build an important administrative skill:

> You should give more information. Right now the information which is there is all important in some way to what we have to do. That isn't so in real life. In real life you have to filter the information you get. Some of it is garbage and we should have to filter what we get. Filtering is an important skill. (Werner, Interview)

However, Werner was an anomaly. Virtually all other students reported directly or indirectly that when they looked at the volume of information they needed to read and learn to feel comfortable in taking over as principal they felt overwhelmed. As Ingrid and Glenda put it:

> The amount of information is overwhelming. I begin to wonder if I will ever feel comfortable with all the information. Do new principals experience information overload, I wonder? Already I'm beginning to worry about botching a decision because I've overlooked some vital piece of information. (Ingrid, Journal)

> Are they conveying information I need to make appropriate judgements and decisions as a principal? The task of absorbing all this information so quickly seems almost overwhelming. I know deep down inside I enjoy the challenge. (Glenda, Journal)

Budget materials. A special and particularly problematic sub-section of the file materials was the one dealing with the school's budget. The difficulty began with the Rutherford School District and Pembina Elementary School using a system of school based management. With the exception of those students from the Edmonton Public

Schools, none of the students had any experience with this way of managing. This problem of a lack of conceptual familiarity with school based management was compounded by a lack of experience with budgets, their layout and use, by those students in the class who were not school or district administrators. And when these administrators were unfamiliar with school based management it could be somewhat difficult for them as well. This meant that the language of the budget manual and manual's topics were also unfamiliar to students. Given the time pressure on them in the simulations they tended to finesse budget items in a variety of ways. Angela asked her school secretary to look into it for her:

> I asked Madge to look into somewhere -- but no, again, I thought right now I have just so much time and this isn't an urgent item -- it is something that we can look at next week -- next month -- and I wasn't going to pull the budget.... It is not an urgent item right now. I would set some time aside to look at budgets, make plans for it, then work on it. (Angela, Interview)

Susan, on the other hand, thought she could get the help she needed from central office:

> ...and from my own background I don't have any knowledge as far as budgets go, especially school based budgets, 'cause we don't have them in our system.... I don't know if you remember, one of the situations was about getting more help in the library and my answer response was that I would ask downtown about hiring help and I remembered that this school is responsible for its budget, so I didn't... and so, you see, I kind of went by my situation and then I all of a sudden remembered.... (Susan, Interview)

Observations and student comments seem to indicate that budget materials should either be dealt with more extensively in the course, and better support and information layout be provided for budget materials in the simulation, or consideration should be given to eliminating them altogether.

Other than this concern with budget materials, the file system seems to contain information which students find valuable. The richness of this file system communicates to students the vast amount of information which an incoming administrator must master in a very short time, and provides them with some reassurance that they are working in the information rich environment they would find in a school. This reassurance definitely adds to the perceived validity of the simulation.

Intertwined with the use of the file materials is the use of the on-line references which have been provided for students to consult.

Student Use of the Reference Materials

The references provided to students were the Alberta School Act, the Young Offenders Act, the Child Welfare Act, and a grade four health curriculum. Some students were interested in the legislative references, but felt their use of the references was limited by the way the information was laid out within them. As Leslie put it in an understated way: "I used the manuals during the lab, but as I told you, I had some problems finding what I wanted.... There could be more choice categories in some of the reference manuals to help us find things better" (Leslie, Interview). Ingrid wrote in her journal about how she satisfied her curiosity about what the School Act has to say about suspensions, something she should have been able to look up quickly on-line:

> I also know that the School Act outlines what can and cannot be done in the case of suspensions, but I didn't know what section it was in until I went home and looked it up in my School Act book. I didn't look to see if their [*sic*] was a subject index at the back of the last [*electronic reference*] section. I just gave up after scrolling through section 1 of the School Act. (Ingrid, Journal)

Both the instructors interviewed saw this as a problem as well. As one of them put it:

> I have the feeling that the legislation, the School Act, because of the nature of its indexing, or the lack of index, is not as accessible and useable in kind of an on-line sense that I would hope for. (Instructor One, interview)

Each act was listed by its table of contents, but only by chapter number, not by any descriptive title. This was a function of the number of characters which could easily be placed and seen in the choices box. The search and retrieve tool which was meant to help students overcome these problems did not seem to be easily understood and used by them as we have seen above. As the second instructor put it:

> It's really hard to use that 'Find' option in any kind of productive way. And maybe if we can work up something better with the next version those pieces will get occasional use. But we're going to have to work on that because people are used to looking up something in the Child Welfare Act, looking up the index and thumbing through, and sort of nailing the section. (Instructor two, Interview)

The problems associated with the electronic organization of the legislation was compounded by a problem of language. The terms which students commonly used to describe certain things were not those legal and quasi-legal terms chosen by the framers of the acts to describe the same things. A table of synonyms, a common database technique which might have gone part of the way in redressing this problem, was not a part of the search and retrieval tool design.

As with the filing system, students had their own ways of solving the problem. In many cases students were already highly conscious of the legislation that affected their work and did not feel the need to refer it. Larry and Angela explained it from their points of view:

> No, I'm quite knowledgeable of most of them, working with them. In fact, my own discipline policy is almost the same as that, and I know enough of the School Act and the Child Welfare Act that I don't feel that I need to [*check things*] for that kind of in-basket. But I think they are valuable for those who don't have the background. (Larry, Interview)

> I looked at them enough to know that they were there and not more than that because I had studied them in other previous classes that I had taken. So I felt sort of familiar with what's in the Act. I didn't pull any of those up on my screen for any of the things that I dealt with. I didn't do that. (Angela, Interview)

Other students who were not as familiar with the contents found solutions using the paper based technology with which they are so comfortable. As Susan described it:

> The only one I found that would have been difficult is if we had to look into the Young Offenders Act or the Child Welfare Act... where all it says is Chapter 1, Chapter 2, Chapter 3. And what I did is brought a written copy, not of the Child Welfare Act, because I couldn't find one, but of the other two, the Young Offenders Act and the School Act. So those, where it said Chapter 1, Chapter 2.... Those didn't give enough of a clue what was in there. (Susan, Interview)

Students generally felt that the reference materials which were available to them were appropriate and were the ones which should have been provided. There was one additional reference which students occasionally asked after. This was the ATA Handbook and the Professional Code of Ethics for teachers included in the Handbook, which the course developers had tried, without success, to obtain permission to include. Of all the students, Elaine felt most passionately about the absence of this reference, and the Code of Ethics in particular:

> The one thing, and I mentioned that in class, is that I do find that the information about the Professional Code of Ethics is sadly missing. When I find out why, it just makes me ill, because teachers fight this image all the time, whether we're a profession, or not, or whether we can police ourselves. And then I find out that this pettiness is going on that prevents

> the sharing and collaboration and it makes me absolutely ill. (Elaine, Interview)

In addition to the text based materials a series of video vignettes was developed to provide students with additional information regarding the personalities of the staff, their approaches to teaching, and the social relationships they maintained. These will be discussed in the next section.

Student Use of the Staff Profiles

Stacey Metzger is a new principal from outside the Rutherford School District. Having been in the community for only two weeks when school starts, he or she goes into the first work session knowing little about the staff at the school. In the simulation the little that the principal knows is picked up from the orientation videotapes and the teacher files. From the time of the first work session during the first week of school and the time of the second in mid-November, Stacey learns considerably more about the staff at Pembina. To make that knowledge available to them, the learning system provides an opportunity for the student/principals to review video staff profiles for all teachers and support staff after the first work session. These staff profiles are designed to show how the teachers teach, what their personalities are like, who they associate with, and how the politics of the school seem to form. After a motion video sequence with two to four segments lasting one to three minutes in total, there is a cartoon sequence showing more of the social and political interactions of staff members. Students found these materials to be one of the strengths of the simulation, giving them information they found invaluable in assessing how staff were involved in the problems at Pembina, and how they would respond to the actions Stacey might take. As Elaine put it:

> It's hard to say that the staff profiles are really -- I think those are excellent and I spent a lot of time with those because I found when I was making decisions the first time I maybe didn't know people well enough. I had gone from the verbal cues, and having the ... people is really effective. And so I did come back and do the staff profiles two or three times, and I found I learned the people a lot better, so I really think that is a positive. (Elaine, Interview)

While Elaine's comment characterizes what almost all students felt about these video profiles, one student felt uneasy about the production technique. In order to provide more information to Stacey about various staff member's feelings and about politics and social situations in the school, some profile sequences are constructed as if Stacey is overhearing a conversation. Some of these seem quite natural, but a few of them take 'artistic license' allowing Stacey to hear things which would probably not be discussed in front of him or her in real life, but which they might hear about in more circuitous fashion. Leonard was bothered by this approach:

> When I was moving through the 'staff profiles' last week preparing for in-basket 2, I was struck with the feeling that I was somehow eavese [*sic*] dropping on staff conversations. I felt uneasy about the way these staff profiles were set up. I wondered whether prospective administrators or teachers would think that this is how principals get their information. A better way might be to have Stacey's alter ego interpret the staff 'situations' as revealed in the staff profiles. (Leonard, Journal)

While Leonard and a few other students may have felt mildly disturbed by this technique of witnessing conversations, and presumably by what it implies about the principal's behaviour in the school[1], there was generally a strongly positive response to the staff profiles.

The staff profiles were not only available for study in preparation for work sessions two and three; the material on the videodiscs was organized so the staff profiles would also be available during these work sessions without changing discs. It turned out that students did not view the staff profiles during the simulations, and at first this was a concern to the designers and instructors. No student was ever observed by an instructor viewing a staff profile during a simulation, and only one student reported during an interview having done so, and then only once. As time went on it became clear that rather than being a problem, students not referring to staff profiles during a work session was a strength. The students wanted to know their staff well enough that they could deal with them and with the issues involving staff members without taking the time to watch the profiles again. Instructor one described the view of how students are dealing with the staff profiles which has evolved:

> Well, I never have seen students refer to a staff profile during a lab and that pleases me because I would like to think that... like in real life we feel that we have sort of sized up each of the key people we work with. Now we're always learning more about each other, but at any given time we have a really -- I think a pretty good idea, and sometimes a really good idea of what we can expect from person 'A' and what you really can't expect from person 'A'. (Instructor one, Interview)

Student comments would bear this out as evidenced in these comments from Rita, Larry, and Angela:

> No [*I didn't look at any staff profiles during the work sessions*]. I had memorized them. (Rita, Interview)

> No. But I probably took three hours painstakingly slow, going through them the week before -- the Thursday night before -- and felt I had a real good understanding of them. (Larry, Interview)

> Well, I came in on Sundays and I went through the staff and I made notes on them and I guess I didn't really think of that as being something that

> I want to do during the time. So, I didn't. (Angela, Interview)

Although they didn't look at the staff profiles during the simulations, some students did make notes on the staff which they referenced while they were working, as previously mentioned. Larry and Elaine were two of those:

> Yes, when I went through the profiles I made a list of all the staff members in alphabetical order. (Larry, Interview)

> So, I had five pages of notes on the notepad concerning staff from the profiles, and that's all highlighted so every week I read that, and that's been since the end of January. So I feel very confident about that material, I didn't feel I had to go back and look at those things. (Elaine, Interview)

The staff profiles proved to be a very effective tool for enriching the situational information about Pembina and the people who worked there.

Student Use of the Notepad

There is also a notepad facility built into the system and made available to students for their own purposes. Students were advised in the orientation process that the notepad was for them to take any notes they might like and keep them available for the duration of the course. The notes might have been taken later for inclusion in their journaling or for any personal references the students wished to create, such as those many of the students created in paper form. These notes were considered to be private, and students were assured that their instructors would never ask to see them, nor look at them on the hard drive where they were stored. In the design for this project this was more a matter of staff ethics than a matter of computer security. While the students' privacy was always observed, project resources did not permit the programming of any levels of security to protect their files, other than an unusual file name and storage in an unadvertised location. These protections were trivial, however, and could have been breached at any time.

The notepads were not extensively used. Comments in the interviews would suggest that students either did not register what the notepad was and how it might be used when the tool was explained in the orientation, or they were simply too busy to be bothered with it. Typical of students' thinking about and knowledge of the notepad is this exchange with Larry:

> If I could make a notebook to keep alongside while I was doing the staff profiles, instead of writing on the paper you could just have it there and then press a button for whatever and whoever, with all the cross references. As I watched I had three papers in front of me at one given time, whenever there was a group of people, I added those to each of them to make it a more intensive profile... ...[*After having the features of the existing notebook described*] I wasn't aware that it was that versatile. And how much space would be in it?.... And I never even thought of using it the night I sat and went through the profiles. (Larry, Interview)

One or two of the students observed and interviewed realized the potential of the notepad and took advantage of it. Elaine is a good example:

> What I had done when I went through is -- I had taken my own notes, then I had turned around and summarized on the notepad. I used that notepad quite a bit. So I had five pages on notes on the notepad concerning staff from the profiles, and that's all highlighted. (Elaine, Interview)

Larry's experience is more typical of other students than is Elaine's, as observation notes and interviews bear out, suggesting the major issue here is not the provision of a notepad but how students can be effectively oriented to its existence and use.

Other Course Activities

As observed earlier the orientation work and the simulations themselves only culminate in significant learning when they are blended with the other course activities, the de-briefing seminars, the tutorials, the readings, and the reflective journaling activities. While all of these are important and will be discussed in turn, it is the de-briefing seminars which lead most directly to learning from the simulations.

The de-briefing seminars. The vital importance of the debriefing seminars has been previously emphasized. The way the learning from simulations is focussed in these de-briefing seminars may best be exemplified by the thoughts of experienced administrators. Gene, a very experienced system level administrator, and Larry, a seasoned principal, talked about it in similar ways.

> This is the first course I've run into like this. It is kind of in a class by itself. I think it is particularly valuable. Like I say, in practice you never really get to have any real meaningful comments on your actions, or the elements that went into your decision, because nobody feels involved in solving your problem, they just give you an off hand answer. Whereas this one -- If you wanted to you could probably say let's talk about number 13 and everybody would identify what the important things were, and what are you doing, and why. And it would be meaningful. (Gene, Interview)

> But I never know the quality of the decision in the final points, all I know is: It worked. I could go ask my assistant or somebody and say, "Here is the situation, what would you have done?" But those guys don't live it. It really isn't an issue to them, so they give you an opinion but it's off-the-shoulder. Whereas everybody in that class, they had to deal with that issue like it was important to them, so I'm not getting off-the-shoulder reactions from them. And I don't get that in real life. There is no way I ever get that -- whereas in class I can. So what it does, I guess, it let's me look at what I'm doing and I get a lot of perspectives on how other people would deal with that problem, and from that you can get an insight into what you are doing and the degrees of correctness of your

> action. Whereas in real life, if you don't get the degrees you just know that one was okay or it wasn't okay. One of the things that really struck me was, after the first in-basket, going through a couple of issues ... was that, in some ways, I was almost polar compared to the rest of the class, in that there were some issues that in my mind I had sized up the situation and I was jumping in and pushing it to, I call it the 'fight-or-fold' situation.... So in a way, I could have moved too fast, or the other people were not moving fast enough and they would have come around and said, "Hey, finally, we're down here and you've got to deal with this." But that prompted me to think about my actions. Am I to precipitous? I'm not sure I am, but it made me think about that. I would have never thought about that had I not had this kind of circumstance. (Gene, Interview)

> The interaction, I think, for myself, is the most beneficial. I've been doing this for awhile, but I've never had a perception check with anybody. Now I can have it and get response, and I tend not to say too much because a lot of these people that I have been with in other courses, sort of -- "You're experienced. We'll listen to you." So I deliberately don't say too much, unless it's something I just can't be quiet about, and listen to them, and I'm getting a lot. Plus Bill's insights. The little things he shares are very beneficial. He's been there. He's been around the block. (Larry, Interview)

In a similar way neophyte administrators also see the value in the varied perspectives and the internal search for what they believe to be the best approach for them, while they engage in an external exploration of consensus. Rita was one administrator hopeful whose perceptions of the value of the seminars were similar to those of veteran administrators:

> I see the debriefings as really important because there are all these different viewpoints for A to Z, as far as experience, as far as backgrounds, as far as perspectives that people bring. So one problem can be looked at in so many different ways, and you can reach a conclusion that could be the same, but could have been reached in a vastly different way than somebody else reached it. So, to just realize and to just have that opportunity to share with other people -- you know how they came to the decisions they did -- is really valuable, I think. (Rita, Interview)

The seminars are energetic and involving. Students want to discuss their actions and they realize that the discussion doesn't just hinge on the vicarious experiences at Pembina, or the wisdom of the experienced administrators in the group. Werner observed, "The responses in the seminars seemed governed by experiences in schools generally, not just those in the simulations" (Werner, Interview). Another student, Arthur, who was also an experienced principal, indicated that the parallels to ideas in the literature began to become obvious to him after the second work session and seminar.

Differing ideas of what a school should be and how best to deal with people meant there were always opposing points of view when students discussed both the preferred processes for use at Pembina and the solutions to the problems. Elaine captured the essence of many interactions:

> People are always fascinating, and whenever you put people together you have conflict or conflicting ideas. And that's how you grow. Sometimes it's worth discussing, other times you know it's not. And certainly within that group of people, I respect them all in their own right, but to say that I share values with them all -- no. Would I argue with them all? No. There would be a couple I wouldn't argue with because there wouldn't be anything to be gained by it. You state your case, they state their case, and you realize there is not going to be a lot of interchange, and you accept that. And I think it's something that you learn when you work with people, is, you cannot change the world, and maybe you're not ready to change in that particular respect, so you leave it alone. (Elaine, Interview)

One of the instructors summarized the hopes of the course design group for the seminars this way:

> The crucial thing was not that they may have engaged in ways which were better or worse, but rather that they have an opportunity to think about what they've done and to hear how other people thought about what they did, and to gradually begin the building of more sophisticated notions of

> what's possible for them as individuals, as administrators. (Instructor One, Interview)

It was never possible in the debriefing interviews to have students discuss all of the items in the work sessions. There simply was not time. Neither was it possible to hear from each of the students on those issues which were discussed. To help address this problem, students were involved in discussing issues in groups of two, a technique which was described as peer debriefing. Instructor Two described peer debriefing from his perspective:

> It's an absolutely essential strategy to include in the course. If we tried to debrief all of the items with the twelve students in the room all together, we would simply not get -- we would not make any kind of reasonable progress through the issues. So, it's a matter of efficiency. B.ut there's also another dimension to look at, and that is that -- umm -- in a group of twelve some people are going to be reluctant to talk and even when called upon by the instructor to talk, will not feel comfortable, or not be able to be as articulate as they might be in a smaller group. And it just seems that people that feel that way contribute much more fully in a small group. I suppose it's easier to talk to two people than it is to eleven people. (Instructor Two, Interview)

A small amount of time was made available for peer debriefing after the second work session, and a larger amount of time after the third work session. Students were, of course, free to use coffee breaks and gatherings they set up on their own before or after class to continue peer debriefings. So engaged were students in the items and issues defined by the simulation that these 'extra-curricular' peer debriefings occurred quite frequently. The groups which were established for peer debriefings were not chosen by students themselves. The instructor assigned the groups, trying to match students in meaningful ways to help both grow from the exchange. One common pairing was to put an experienced principal with an administrative neophyte, but often this was not possible because of mismatches in the number of both in the class. Other grounds for matching were used in these cases. One such alternate choice would be to put a student who seemed more intellectually mature, in the opinion of the instructor, with a student who appeared to examine things in a superficial and/or instrumental fashion.

Tutorials. To add elements of direct instruction to the course as necessary, at least three classes are devoted to exploring topics such as the nature of the principalship, staff development, or school-based budgeting. A variety of instructional techniques have been used in these tutorials. Usually a tutorial starts with a mini-lecture and then moves on to role playing activities in the case of the staff development tutorial, or some other form of paper based activity in the case of the school based budgeting tutorial. Often course readings are drawn back into tutorial activities in one way or another. Both of the instructors offered insightful comments about the purposes of the tutorials and how they are received:

> What I'm thinking about right now is how students respond to the tutorials, which is, I suppose, positive in a sense, but not -- not with the same kind of passion that they respond to the simulation itself with. The two tutorials that I make sure that I always get into the course are the one on school-based budgeting and the one on working as a consultant with staff, as a helper. So we do the role plays, and there's a mini-lecture and a little activity on school based budgeting. And the students think quite positively about these activities, but very seldom do they write in their journals something -- something that would suggest that they've led to a really deep insight on their behalf. Very seldom do they refer back to them in seminars or in journals. I think they're important topics to include, but not the most dramatic and influential parts of the course. (Instructor Two, Interview)

> But I think the tutorial component enables them to really pull together

> their thinking in a more fundamental way about the school that they're the leader of. So that they're not responding to, kind of, individual situations, but this gives them an opportunity -- requires them -- to think about the school in broader ways, so that they have the whole range of situations in front of them that need to be addressed and think more strategically about the school -- umm -- to get a better picture of, kind of, the overall direction they want to steer this thing. (Instructor One, Interview)

Readings. The element of the course to which students were drawn to a greater or lesser extent depending on their orientation to life, and their individual learning style was the readings. One of the more avid readers, Elaine, expressed it this way:

> I'm a reader because that's how I learn. I read and I write, so I love reading. I love ideas, so I read the textbooks right away. Two of them I had already read, so that wasn't a real demand on my time. I'm now re-reading. They are -- all three of them have yellow stickies throughout with my comments -- my initial reactions. As I'm doing my journals, and as I go through the course with the different problems that come up, there are things that go through my mind. I remember reading in Sergiovanni or I remember reading in Barth, and in the Fullan book. There are several things there I have found recently applied to the kinds of interactions amongst staff members that have come up in the in-basket. (Elaine, Interview)

Many other students pursued the readings for the course with less alacrity. Most students could see the value in the readings, but because of the other demands in the course and in their lives they did not spend as much time on this aspect of the course. Angela had this to say:

> Well, the articles that I did read were excellent, and I know that the ones I haven't read are probably excellent, too. And I did more reading in February than I have in March, and journaled it then. And my recall is that was very applicable because again, it is the bridge of taking the formal learning, the philosophy, and seeing where it shows up in a real world or a simulated world. (Angela, Interview)

One of the students who did little reading, whose journal was very thin, and whose class performance, when it occurred, was more grounded in his daily life experience than in Pembina school and the readings, was Werner. Werner was taking on new job responsibilities at the time he took the course during a summer session, and was at work when he wasn't in class. According to him it was the pressure of work which caused him difficulties: "I did the readings but I had no time to reflect. I couldn't do it with my new responsibilities, and by the time I got home at night, other things had to be dealt with" (Werner, Interview). Now whether or not Werner might have performed better in the course if he had not been working might be debated, but the pressure of work he and others felt was described as a factor in several cases.

Instructors responded to the problems students were having with the readings by encouraging them and by being somewhat more directive. Instructor Two interpreted the cause of the problem as being somewhat different but he acted to try to assure students involved the more theoretical aspects in their administrative practice:

> That's an area where we've been challenged as instructors, to -- uuhh -- to encourage students to include in their thinking. I think that the experience in the simulation is so compelling, and the talk and the writing are such that they -- that they're compelling as well. That students are drawn to those two kinds of activities in the course, and they're -- I think that's a strength of the course -- and they're less drawn to read about the substantive issues that they're dealing with, or what theoretical perspectives might come to bear on those issues. So that as instructors we've had to work hard to encourage people to write, and I've become a little more directive in this area. I've assigned a few more readings than what I would have, perhaps, at the beginning, or when I first started teaching the course. Often in feedback in the journals I've asked specifically that students spend some time thinking about how what's written bears on what they are saying. (Instructor Two, Interview)

Journaling. Another of the critical elements in learning from the simulations and from the readings was the reflective journalling which each student undertook throughout the course. The importance of reflective journalling to learning has also been described in the literature (e.g., Boud, Keough, and Walker, 1985).

The amount of reflective journaling each student managed to accomplish varied greatly and the insights seen in the analysis of the simulations and seminars, and the readings, also varied a good deal. The range is hinted at in the following student comments: the enthusiastic affirmation of Elaine, the uncertainty of Rita, and the defiant hopelessness of Werner.

> That's again useful -- I have three journals going now, at this present moment. I sometimes forget which one I'm writing in,... but it is a very effective way, again, of thinking through and getting down on paper what has been happening, what you are thinking about, what you are wondering about, what I believe, what my beliefs are. So, I really quite enjoy it, and I really get into it sometimes, especially on the philosophical level. I really like that because often, in my past, no one has ever been interested in even hearing about what I think, and now I have people who are wanting to read it.... It is a good way to tie it together. I would think more constructive than just doing papers or researching. (Elaine, Interview)

> I guess I'm not really sure if the insights that Bill wants us to draw out of it, I'm actually drawing -- whether I'm just reacting to situations, say for instance, the first in-basket. After I looked at my log book... I was thinking, I'm kind of melodramatic. I should be an actress, not an administrator. And I'm not so sure if I'm reacting, or if I'm actually making sense in there. (Rita, Interview)

> My log is very unreflective. Students should be told how time intensive this course is and no other classes should be permitted, and students shouldn't work when they are taking this course. (Werner, Interview)

In addition to learning about the principalship through reflective journaling some students felt they were learning about reflective journaling and seeing reflective journaling in a new light. One of these was Larry, who seemed almost surprised when he said, "Okay, but indeed, that is something I am learning, as well, the reflective journaling. I had no use for it prior to this. Because it is a dictate, I'm doing it and finding it beneficial" (Larry, Interview). Another student expressed a view of reflective journaling in a way that the course developers and instructors might have thought ideal. Ironically, the student who seemed to understand exactly what the journaling assignment should lead to was Werner, whose work load and his general attitude were obstacles to accomplishing much in the course. Although in his case one wonders whether it is anything more than an eloquent sentiment, Werner had this to say about the reflective journaling: "Logging and reflection are very valuable in education, and I think they are under used. It's a career skill for us, we can use it on an ongoing basis" (Werner, Interview).

The focus of the journals, the topics of interest to the students, and the quality of the insights also varied a good deal as might be expected. It was clear, however, that the journaling assignment was an effective tool in having students pursue ideas that came to them in the simulations and seminars to a greater depth, and in establishing a dynamic relationship between these activities and the reading they were doing. For students of a more philosophical bent or who read regularly, the journaling provided an outlet for discussing their reading directly, which was largely absent from class. For these students reflective journaling became a tool for extending their learning from their reading. In the previous section we saw how positively Elaine thought reading and journaling fitted into her learning. Gene put it this way:

> There are two elements in the course that I am learning from. One is the

> journal. We'll dispense with that one first. I think you get a lot by just reading and commenting on what you read. What I've learned to date, I've picked up a lot from just reading and writing in the journal -- No, it isn't all from reading. Some of it is from class discussions and the simulation itself. (Gene, Interview)

As a second part of a strategy for learning from simulations, the student journals and the comments in the interviews demonstrate clearly that reflective journaling is an excellent companion assignment to the seminars in learning from the simulations and integrating that learning with their reading. Moreover, because of the nature of the course structure, the journaling assignment appears to be crucial for students in integrating many of the concepts from the readings with what goes on the in the simulations and seminars.

The Blend of Activities in the Course and the Place of the Course in a Graduate Program

One of the interesting summative explorations with students and with the instructor was the question of whether the blend of activities in the course is appropriate, and where the course ought to be positioned in a graduate program. Students who were towards the end of the their programs seemed to have a richer background on which to draw. On the other hand, students who were rich in experience seemed to be able to use that to provide them with a focus for both the simulation activities and for their reading. Students seemed to feel the blend of activities was working for them, although they could only speculate on what another structure might be like. For the most part, however, one is inclined to believe that professional educators could accurately conceptualize alternatives to the simulation course structure, and consequently one tends to give their responses considerable credence. Elaine, perhaps, summarized it best:

> Yes [*the blend of activities is right*], I would definitely think so. Definitely the reflection that is promoted is excellent because most administrators in a day's work would not have time to do that. So I think it is excellent. If you can create that habit, if you can create that cycle of observation, reflection, and growth with the administrators, the course has accomplished a great deal. (Elaine, interview)

But some students didn't find that the mix went together well for them. Werner, who had trouble with the course, generally, did not feel the approach worked for him. His comment, not expressed by other students, was: "The theory part wasn't worked in well. The seminars work into the labs all right, but the readings and theories should be worked in to help us understand reflection and how you can do reflection in short time periods" (Werner, Interview). While Werner's comment has some resonance based on observation, it is difficult to give it too much weight, given the absence of similar sentiments from other students. Perhaps the comment from one of the instructors on the blend of instructional activities provides the best perspective here: "The question is a difficult one because we're working within an economy of time ... and the time being a very finite resource...." (Instructor One, Interview). The other instructor interviewed also concurred: "I think the mix we have is pretty good right now" (Instructor Two, Interview).

With regard to the placement within a graduate program for principals both instructors felt it was best placed towards the end of the program and, as previously stated, students who had taken the course towards the end of a program seem to deal with the demands better and, perhaps, be more successful in synthesizing all of the elements of their learning. Instructor Two synthesized it this way:

> I like it at the end of the program, and that's just -- nothing rigorous about the way I've examined that question, David, just my feeling about my experiences with students that have taken the course and, in fact, the students who have had the field experience component of the principalship program before taking the simulation have told me that it's just a wonderful synthesizing experience for them. I think it fits best at that point in the program. (Instructor Two, Interview)

Given the positive responses of most students to the specifics of the simulation environment, to the simulation activities themselves, and to the way the simulations are blended with other activities within the course, we are still left with the question of what students are learning from the simulation activity and from the course.

Chapter 6

Student Learning Within the Simulation Environment

Overview

As can be readily seen from the previous chapter, the open ended nature of the simulations and the manner in which the other elements of the course come together in an integrated whole make it unproductive in this study to try to separate what students might learn from which simulation work session or which course components. Cunningham (1984) reinforces this point of view as a simulation theorist:

> Educational simulations are particularly important for transferring learning in processes such as communication, decision making, conflict, and the like; they are especially relevant for skill development. It is probably not possible to understand fully the specific skills learned, especially since individuals will gain different insights from the simulation. (p. 227)

Rather, discussing the learning of the higher order thinking skills of interest to the course developers and instructors in the experience as a whole would seem more fruitful. It is in this context that this chapter presents information relevant to answering the first general group of research questions in this project: What can we discern about what students are learning in the simulation course based on the Pembina Elementary School simulations? What facilitates this learning? What gets in the way?

In previous work the development team has addressed a number of pedagogical issues related to the design of experiential learning based in simulations (McIntosh, Maynes, & Mappin, 1989; McIntosh, Mappin, Maynes, & Ward, 1991; Maynes, McIntosh & Mappin, 1992). In that work we have suggested five areas of learning which are resistant to classroom-based studies but are addressed in programs with a strong professional practice component. These five areas, presented fully in Chapter 1, call on students to develop a recognition of the personal demands the principalship will place on them, understand their fit with those demands, build necessary management and human relationship skills, extend their problem analysis capabilities, and increase their personal resilience and sensitivity.

There are also three general learning objectives associated with the course which may be found in the 1991 and 1992 editions of the Student Handbook as follows:

> At the conclusion of this course you should have developed:
>
> 1. a better understanding of the ways in which you can think about and solve practical administrative problems in the light of administrative thought;
>
> 2. a more clear appraisal of the importance of school culture as a factor in influencing school effectiveness, and a more clearly thought out personal vision for your school;
>
> 3. a more advanced formulation of your views of school leadership, in terms of your personal strengths and values, on the one hand, and relevant writing and research, on the other. (Student Handbook, 1993, p. 2)

In addition, there were three clusters of specific objectives:

> 1. human skills: interpersonal communications; exercise of judgement; helping, consulting, and coaching/mentoring; conflict resolution;
>
> 2. problem-solving skills: identifying administrative problems, establishing priorities, weighing alternatives, using appropriate decision-making procedures;
>
> 3. technical skills: time management, delegation, and budgeting. (Student Handbook, 1993, p. 2)

Almost all of these involve higher order analysis and synthesis skills. None, including the technical skills cluster, is dealt with in the course in a manner amenable to evaluation through conventional testing procedures. This creates a very significant problem for any kind of on-line evaluation within the simulation. Evaluation and the consequent understanding of learning in the course, then, must come indirectly from observations of students in the work sessions and seminars, and through the writing they do in their journals.

While the technical skills listed in the objectives -- time management, delegation, and budgeting -- are usually presented in an instrumental fashion involving a sequence of procedures and logically ordered decisions, they are not dealt with in this fashion in the simulation course. A student needs these skills in the simulations and lacking them needs to work at their development, but the course does not deal with them in other than a conceptual level and in a self-analysis and monitoring way. A review of the journals, and observations of the seminars and work sessions, suggests that while time management and delegation are worthwhile concepts for students to keep in the forefront of their minds while they are working with the simulations and critiquing themselves, there is little discussion or consideration of standards or ideas of appropriate performance. In the single tutorial devoted to school based budgeting the approach seems far more a conceptual skill development exercise than anything that would enhance the technical skills of budgeting or budget modification.

The portion of this research project dealing directly with student learning was crafted to gather information on student learning as it relates to course objectives, and to explore students' perceptions of the learning experience with reference to the five areas resistant to classroom learning techniques which were identified by the development team. In the main this was done by asking students directly what they thought they were learning, and following that up with probing questions depending on their responses. The question was also pursued indirectly by analyzing students' reflective journals and by observing their responses in class.

My assessment is that the general and specific objectives for the course overlap with each other, and with the five identified areas resistant to classroom learning. Interviews, analysis of students' reflective journals, and observations did not elicit information which would illuminate learning with regard to all objectives and topics and, consequently, one general and four more specific topics, which can be addressed in some depth as a result of this research, have been selected for discussion here. The more general topic addresses student responses to the question of what they were learning. The four more specific topics are learning problem solving; improving judgement; monitoring role performance and identifying strategies for ongoing improvement; and students' awareness of their personal fit with the role, including the personal demands of the role.

What Students Think They Are Learning

In the course of the interviews students were asked directly what they thought they were learning and how they might be learning it. A series of probing questions was also used to explore specifically whether students thought they were learning more about problem solving and making judgements, and how they thought they might be learning these things.

Two essential impressions the researcher gained from his investigation of student learning were how difficult it was for the majority of the students to conceptualize and articulate the specifics of their learning in any depth and, secondly, how idiosyncratic, how highly personal, was much of the learning for each individual. Almost all students observed and interviewed would state that they thought the course was an excellent one and that it was useful to them. When asked what they were learning and how they were learning it, most used the phrases which the course designers use to talk about hoped for learning, such as problem solving, decision making, or judgement. However, when asked to describe this learning, most students would talk about superficial aspects of their learning or talked around the subject. Others like Joyce and Elaine were highly articulate and introspective, and they were able to provide excellent insights into the process which was going on in their minds and how they were trying to change their behaviour. For example, consider Elaine's description of problem solving:

> If I had to say anything I had really learned in the course that was relevant to me in this present state in which I am, it is the problem solving. Helping other people problem solve, or becoming involved with other peoples' problems, but in a very proactive way, not assuming the problem. The handout, Kolb's handout, that Bill gave us was excellent, and then we modelled that last week when we were doing our pairing -- our conferencing. Good progression from talking as a group ... to now pairing and helping each other think things through, and reflect upon situations, and move through. It's a good focus ... so I have learned not to dismiss people, or treat the problem like it is one of twenty, which it is usually in my day -- try to listen a little more than handle the problem -- try to involve people in problem solving. And I think that has carried over into my real life. I'm not solving other people's problems quite so much any more. I'm maybe more into empowering, letting them keep their problems, but trying to get them to deal with them, if it bothers me, which it does. So that is what I'm learning, how to empower, and even though you think you might have the right answer, keep your mouth shut, and let people discover it for themselves. (Elaine, Interview)

Joyce's insight into the process of her learning in this situation is also striking:

> One of the major benefits of a course such as this is that the learning is immediate. Practice is occurring at the same time as reflection on the practice. Being able to practise decision-making and communications skills in a real situation, but at the same time to be able to stop the process and reflect on it, perhaps change your mind, decide why you did what you did, is a powerful example of learning in action. One of the most positive features of my first session was the immediate feedback that I was able to give myself. I knew right away what problems I was encountering and where I was not as knowledgeable and confident as I could have been in choosing a particular course of action. (Joyce, Journal)

Many others behaved in the seminars and wrote in their journals in ways which hinted at learning in a similar way, although perhaps in not as sophisticated and complex a manner as Joyce, Elaine and Gene. These students definitely fall into a category the development team has previously described as model learners (Maynes, McIntosh, and Mappin, 1992), learners who were highly successful, in part because of their exceptional work ethic. Students who resist learning in a simulation mode were also described in that article. The terms coined to describe these students included intellectualizers, active resisters, distorted interpreters, and self-doubters (Maynes, et al., 1992). The category of resister most represented in the groups observed for this research was the self-doubters, a group which may be described as bringing with them from their previous experiences an ongoing, negatively oriented questioning of their own perceptions and judgements. Susan is a good example. Here is how she described her reaction to the debriefing seminar after the first work session:

> I found it interesting that I had answers that other people actually had. For some reason I thought mine would be just totally wrong, or -- So I found that kind of satisfying and calming, because I was really quite concerned that -- I was concerned. For some reason, I don't know why,

> I would assume that -- this class -- you would have to have all this memorized. But it concerned me, because I couldn't. (Susan, Interview)

At another point in the interview she was quite candid about her lack of confidence and the hope that even vicarious experience might help her overcome it:

> And I'm hoping that it will give me experience, or more confidence in being able to be an administrator, being that I've never had any experience ... and I'm hoping that it will give me experience, or more confidence in being able to handle situations without having to learn it the hard way. (Susan, Interview)

The highly idiosyncratic, highly personal nature of the learning in this course is possibly best illustrated by the range of topics and approaches taken by students. The range of topics which were of interest to them, as expressed both in their journals and in the interviews, was very great and could be directly linked to the students' values, their current position, their personal experiences, their values, and their intellectual concerns of the moment. Perhaps four examples will suffice to demonstrate this range of foci for student learning.

1. Sharon. At the time she was taking this course Sharon had been named principal of a newly built school and was in the process of staffing that school as well as thinking through the myriad other details related to the opening of a new learning facility. This is very evident in her journal and provides an example of how a student's position and her immediate preoccupations influence her learning. Sharon revealed it in simple, direct statements such as, "I wish I had a Filebox like this for my new school -- it would greatly facilitate everything" (Sharon, Journal), and in personal insights such as, "I realized during this experience that I tend to handle things first & then delegate --

I had few people to delegate to. I'LL NEED TO LEARN THIS IMMEDIATELY FOR [*name of her new school*]" (Sharon, Journal), (*Emphasis in the original*). Class activities and discussions also became more directly associated with her concerns:

> Appropriately for our discussion on S.B.B. [*school based budgeting*] (and for my deadlines!!), I have been working on the budget for [*name of her new school*]. I am having difficulty because I usually I have a team of students, staff, & parents who provide input and experiential knowledge. Not only are all of these people absent, but I am stabbing into thin air to determine appropriate directions. I have my stakeholder committee, but they are only ready to react. (Sharon, Journal)

2. Leonard. Another student, Leonard was the principal at a school on a First Nations reserve in Alberta which was operated by the band council. He had concerns about whether his experience in that specific multi-cultural environment would be dissimilar to a school in a more urban setting. His experience in the course allowed him to make comparisons that were useful to him and resolve this issue in his mind. At the beginning of the course Leonard wrote:

> My insecurities are long rooted. I have spent all of my professional career justifying the fact that being a principal at a reserve school is at least as intensive as being a principal somewhere else. I know that there seems to be some sort of a second class stigma attached to working on reserve schools, but that is usually due to ignorance of the job performed. For some very long moments I wondered, however, whether having been 'isolated' on an Indian reserve throughout most of my career might somehow cause me to be less informed than my city counterparts. (Leonard, Journal)

As the course proceeded, Leonard's journal contained a number of entries like the following:

> I would like to comment on the Mike Dumont ... scenario in which a teacher has indicated that the grade one student appears to have marks on his body. A situation similar to this came to a head at my school last

> week. (Leonard, Journal)

> The Keith Dawson incident is of particular significance to me. The scenario: a phone call from Dr. Short reveals that his son has been taken to the hospital and released (after having been treated for a possible concussion) after an incident with his teacher, Mr. Dawson. Dawson quite readily states that he did shake the child but that the child did not display any unusual behavior as a result of this incident. The father, Dr. Short, phones the school to find out what happened and is looking for supportive action. This incident is reminiscent of something that happened at my school last year, during our first year of band control. (Leonard, Journal)

The entries in Leonard's journal examine many of the issues in the simulations and topics which arise in class in insightful detail, clearly demonstrating that he was thinking about administrative issues with a depth and complexity which characterizes the better students in the course. At the end of the course Leonard made this entry in his journal:

> My administrative experiences in a reserve school are not very much different from mainstream city administrators. The realization that the task is very much the same, no matter where you are or what you are doing as a school principal has been very enlightening for me this year. (Leonard, Journal)

3. Lisa. The third example is from Lisa. Lisa was particularly concerned about the moral dimension of education and how a principal might create a good Christian moral climate for the school. Early in her journaling activity she wrote:

> The principal I most admire has had several years to create a culture in her school that reflects many of these same values. She operates under the symbolic leadership model that Sergiovanni talks about. Her school is called Good Shepherd School and it is only a few years old. When it opened, she capitalized on the name of this school and drew on the symbolism of the Good Shepherd and what He stands for. The motto of the school became "Loving, Caring, Sharing".... We first implemented our integration program for special needs children in that school and it was the perfect setting for the endeavor. The motto came through loud and strong, as did the message that Jesus gave us. "Let all the little

> children come forward." Our school district motto is - "To teach as Jesus taught." The teachers and community work to teach as He taught and work together in harmony for the children. I hope that I can create an environment as wonderful as this one in my own school some day. (Lisa, Journal)

Throughout her work in the course her strong moral position influenced her approach to the work and her interpretation of the materials. Lisa is the student who read the last chapter of Sergiovanni's book, the chapter entitled *Administering as a Moral Craft*, first. But Lisa was not a dogmatist, she was a thoughtful student. For example, as she thought about creating a culture within a school she had this to say:

> If the leaders and followers in a school all follow that same moral, intellectual and emotional commitment, there is a greater chance for success. Perhaps, private schools or Catholic Schools, because of their shared purpose, have one less area to contend with because there is supposedly already a value base for the operation that is common to all. The rules are already laid out. The beliefs are similar. Maybe it is easier to reach a common vision. However, there can be inherent problems or limitations when a culture is so entrenched, as well. (Lisa, Journal)

As the course drew to an end Lisa worked at identifying the unifying strands of insight she had identified. Unsurprisingly for her, she had organized a substantial portion of her learning around her personal values:

> First of all, if I am to identify three things that are keys to the principalship for me, I would have to choose them based on who I am. It is much the same as writing your personal philosophy of educational administration. It has to work for me and no one else .... The first area that is critical for me centres around the idea of developing a community with common or shared values. The emphasis has to be on values which stem from my religious and moral beliefs about the worth of all people. (Lisa, Journal)

4. Howard. Finally, as a fourth example, let us consider Howard. Howard was a consummate professional who had been a principal at a smaller school and who now

was working as a vice principal in a larger one. For Howard, learning in the course was more cool and cerebral. His journal was not laced with personal anecdotes and revealing of his deeply held values. It is Howard, alone among all the participants in the study, who mentions early theorists such as Frederick Taylor and Henri Fayol in his journal. His journal is a substantial piece of work and deals with a wide range of topics, but the tone is consistently more abstract than that of his fellow students:

> When one looks at the problems or issues faced by principals today, I think it is fair to note that they will generally fall into three categories: (1) Conflict Resolution; (2) Resource Management; and (3) Public Relations.
>
> Conflict resolution problems tend to be the most difficult to work with, and will require the greatest effort and thought for Stacey. (Howard, Journal)

At the end of the course Howard offered his synthesis of what he had learned. In this journal entry he sets up a typology of nine personal characteristics essential for principal effectiveness. Once more the personal distance and the effort to intellectualize his learning is obvious:

> Through my own personal experiences as both an assistant principal and principal in a rural school system and through past observations and conversations with several successful school administrators, coupled with the many observations and class discussions of our Pembina simulations, I have been able to identify a few traits that I feel are important in becoming a successful and effective school administrator.
>
> The first important characteristics [*sic*] is being **accessible** (*emphasis in the original*). As school principals, it is important that we ask ourselves "are we accessible?" As a practicing school administrator, I think that it is very easy to become "office centred" and so consumed by paperwork, that one forgets to build the bridges of contact with those around you. I believe that accessibility bring with it involvement, which also creates awareness. (Howard, Journal)

While these examples highlight the very idiosyncratic and personal aspects of student learning, for many of the students the learning which came most readily to mind was the integrating experience of the course. This included the way that the course pulled so many things together for them, and allowed them to understand how administrative writing had a role to play in professional practice. It is interesting to contemplate the similarities and differences in how Larry, Angela, Elaine and Gene expressed this:

> I'm not saying I'm not learning anything. It's probably bringing a lot of things together -- helping them gel. (Larry, Interview)
>
> I am learning to, I think, take the learning that I've had at the academic level at the University, or leadership courses that I've taken, and how to apply some of those things here in these little simulations. (Angela, Interview)
>
> I'm also in my 13th course of 14, so I'm almost at the end. This course, probably more than a lot, has helped me pull all of the information together. All of the theory does come together into a more personal framework. Who I am. What I am as a leader, or as an administrator, or as a decision maker. A little less worried about whose is such and such theory on conflict resolution? What would he do in this situation? (Elaine, Interview)
>
> In a way I think that maybe an aspect of applying theory to practice is that it gives you an underlying framework that you never really thought of -- you are using elements in that framework, but you never really thought it out into a conceptual scheme, if you want. So you get the theory, you can say, "Okay, now I see where this fits in," and it probably confirms a lot of what you are doing and puts it in a more complete framework. (Gene, Interview)

Both the highly individual learning experiences and the integration of various strands of knowledge common among students is seen to be complementary rather than contradictory. The two strands can easily be interpreted in terms of the constructivist principles of cognitive learning psychology which have been influencing the course designers. The simulation environment and the nature of the items stimulate students to remember and focus prior knowledge after the manner described by Yates and Chandler (1991), Glaser (1991), and Bransford, Vye, Adams, and Perfetto (1989). Similar concepts are described by Weinstein and Underwood (1985) as active learning, and by Wittrock (1978) as generative learning. The simulation students use their accumulated academic knowledge as well as their experience in their work session problem solving and when they are involved in the classroom seminars. They strengthen the links between these pieces of knowledge, adapt the knowledge as necessary, and build new schema into the structures. The power of activating prior knowledge and integrating it with new learning in ways that seem directly useful may also be a part of what causes students to respond so favourably to this learning experience. Yates and Chandler (1991) describe the importance of prior knowledge this way:

> The assertion that learning is influenced by what a person already knows is perhaps unsurprising. What is surprising, however, is the power of this effect. Once a learner's attention is secured, the impact of existing knowledge on learning will often outweigh factors such as incentive, cognitive style, locus of control, personality or attribution dispositions. (p. 141)

It is critical to note here that existing knowledge may be seen to be knowledge of schools, school systems, students, teachers, and learning environments, not just administrative knowledge. While administrative knowledge gave experienced administrators a certain cachet in the course, and a knowledge base which permitted them to do very well in a course of this type, thoughtful students with substantial experience as teachers also had a significant base on which to build new knowledge and on which to create new links.

This importance of previous knowledge for learning is often also dependent on particular contexts according to a number of theorists. For example, Bransford et al. (1989) cited studies by de Groot (1965) and Chase and Simon (1973) with regard to the importance of known patterns in the recall of chess board set ups by chess masters. Another study by Spilich, Vesonder, Chiesi, & Voss (1979), on recall and comprehension in baseball, demonstrated contextual importance for these tasks. A third study, conducted by Lindberg (1980), showed the reversal of results achieved in recalling and clustering of words when college students and third graders experienced a manipulation of the context for the task. All three of these studies also demonstrated the importance of prior knowledge. The Lindberg study is of special interest because of the evidence it provides that a greater volume of more general world knowledge is not necessarily the critical factor in problem solving, learning, and memory; context can play an equally large role.

It may be seen, then, that there are two sources for the previous experiential knowledge and contextual knowledge that students bring to the course. One is their experience as educators and administrators, and the second is the set of contextual factors so abundantly provided in the Pembina simulation. Both of these are seen as important factors in student learning.

There are two other emerging theoretical approaches to learning which have much in common, and which are seen to intertwine with the constructivist views which have been discussed: the social situation of learning and what is becoming known as situated cognition, or situational learning.

In considering the social situation of learning, Glaser (1991) stated, "cognitive activity in school and outside is inseparable from its cultural milieu" (p. 134). From this point of view the cultural milieu of the school becomes an essential part of learning to be an educational administrator.

Bruner (1990) refers to psychology as "immersed in culture" (p. 12) and argues not for the study of cognitive psychology, but for the study of cultural psychology which he sees as concerned with "*situated action* - action situated in a cultural setting, and in the mutually interacting intentional states of the participants" (p. 19). Further, he argues, it is not biological determination which is the cause of human nature and action. It is instead:

> culture and the quest for meaning within culture are the proper causes of human action. The biological substrate, the so-called universals of human nature, is not a cause for action but, at most, a *constraint* upon it or a *condition* for it. (pp. 20-21)

Voss (1989) supported this position while pointing out that the degree to which problem solving models are culturally bound has not been studied extensively. Nevertheless he identified two conditions under which cultural influence might cause problem solving approaches to diverge. The first condition would be when the processes used "in a relatively technologically underdeveloped society are compared to those employed in a technologically developed society" (p. 282). This has less relevance for the issue under consideration here than the second: "for problems in which the constraints vary from one society to another" (p. 282). By way of example he cites the representation and solution of economic problems in controlled economies versus mixed economies. However, in instructional simulations it is interesting to speculate as to whether the differing constraints of individual school boards, or even individual schools, may influence problem solving to a significant degree.

At this juncture it may be well to revisit the ideas of situated cognition and situated learning (Brown, Collins, & Duguid, 1989; Brown & Duguid, 1993; Choi & Hannafin, 1995; Lave and Wenger, 1991) to reassert their relevance. The three elements of situated cognition/situated learning seen to be important in simulation environments, which have been discussed previously, are: the importance of emphasizing learning rather than teaching (Lave, 1991; Brown & Duguid, 1993); secondly, the situation is much more than the immediate physical surrounding(Lave, 1991); and thirdly, the idea of cognitive apprenticeship (Brown, Collins, & Duguid, 1989). In the Pembina school simulation context, a situation includes both social and historical dimensions and these social and historical dimensions include the learner functioning within a simulated environment. In cognitive apprenticeship one tries to "enculturate students into authentic practices through activity and social interaction in a way similar to that evident -- and evidently successful in craft apprenticeship" (p. 37). Brown, Collins, and Duguid maintain that cognitive apprenticeship "supports learning in a domain by enabling students to acquire, develop, and use cognitive tools in authentic domain activity" (p. 39). Tools in this context also have a special meaning:

> Conceptual tools similarly reflect the cumulative wisdom of the culture in

> which they are used and the insight and experience of individuals. Their meaning is not invariant, but a product of negotiation within the community. Again, appropriate use is not simply of the abstract concept alone. It is a function of the culture and the activities in which the concept has been developed. (p. 33)

Brown et al. (1989) list a series of "salient features" (p. 40) of group learning which should occur in the seminars and tutorials of the simulation course if student learning is to be interpreted as a process of enculturation. Collective problem solving, displaying multiple roles, confronting ineffective strategies and misconceptions, and providing collaborative work skills (Brown et al., 1989) are all on this list and can be seen to be a part of class activities which will enhance the situated learning anchored by the simulations.

Lave and Wenger's (1991) concept of legitimate peripheral participation may be used in interpreting how the debriefing seminars and incidental discussions in the simulations contribute to learning:

> Legitimate peripheral participation is not itself an educational form, much less a pedagogical strategy or a teaching technique. It is an analytic viewpoint on learning, a way of understanding learning. We hope to make it clear that learning through legitimate peripheral participation takes place no matter which educational form provides a context for learning, or whether there is any intentional educational form at all. Indeed, this viewpoint makes a fundamental distinction between learning and intentional instruction. (p. 40)

The importance of legitimate peripheral participation in the view of situated learning theorists is reinforced by Brown, Collins, and Duguid (1989):

> This peripheral participation is particularly important for people entering the culture. They need to observe how practitioners at various levels behave and talk to get a sense of how expertise is manifest in conversation and other activities. (p. 40)

From the point of view of legitmate peripheral participation, then, novice students interacting with the more experienced administrators also enrolled in the course will take from the descriptions of those more experienced administrators the things they think they need to learn and which they view as being valuable to them.

There were also some very interesting student interpretations from the point of view of the importance of context for learning effective school administration. For instance, Rita made this insightful observation:

> One thing that I think is kind of being emphasized, that's really important, is the idea of community connections. The importance of the community. You might be so centred when you get into your school, or have your school to run, on this school you might not be thinking of the bigger picture, and that's sort of in the back of my mind always now, you know. It's not just a school, and that's the entire world -- it's, you know -- the whole community, and all the relationships and the perceptions and the public relations question, which you might -- you might not be as fully aware of this if you don't have this change. (Rita, Interview)

At the risk of over emphasis, what permits this growth in understanding is the rich context which has been developed for the simulation and the way in which the expectations of people in the broader community as well as in the school district office and the school are made known. This rich context may also have a considerable impact on learning administrative problem solving. As will be seen in the following discussion the use of situational or contextual knowledge is also considered an essential factor in expert problem solving.

Learning Problem Solving

Student expressions of how they apprehend the problem solving process, as provided during interviews and hinted at in the journals, were less well formed than the researcher anticipated. The course designers and instructors think about the problems at Pembina Elementary School in much broader terms than each item presented in each work session. In a way similar to a medical doctor listening to a patient describe her or his symptoms, then working past the symptoms to diagnose the real, underlying illness, students must diagnose the more fundamental administrative, organizational, or human problem and take steps to remedy it. To be sure, they must also deal with the symptoms, but in some instances this is simply a side issue to the real concern of defining the actual problem. This ability to see deeply into a problem situation and truly understand it has also been described in a judicial setting as "appreciating" a problem by Vickers (1965).

It is important to remember here that both the narrower and broader simulation problems are the kinds of problems typical of a professional work environment, the kinds previously described as ill-structured or "unconstrained, naturally occurring situations" (Spiro, Feltovich, Jacobsen, & Coulsen, 1991). The complex administrative problems presented in the simulation course have much in common with the ill-structured engineering problems which Spiro et al. (1991) described:

> engineering employs basic physical science principles that are orderly and regular in the abstract for textbook applications .... However, the *application* of these more well-structured concepts from physics to "messy" real-world cases is another matter. The nature of each engineering case ... is so complex and differs so much from other cases that it is difficult to categorize it under any single principle, and any *kind* of case ... is likely to involve different patterns of principles from instance to instance. (p. 26)

In discussing the solution of problems of this sort in psychological terms there are two theoretical positions which seem particularly germane, but which become almost inextricable. One is the work which has been done on expert problem solving and the second, highly related area is study of the importance of contextual or situational factors in problem solving.

The study of problem solving has evolved over the past several decades into a current position of postulating that people approach the task of solving problems differently depending on their understanding of the subject matter and the context of the problem. As was previously discussed, experts in a particular domain tend to solve problems using a deep understanding of the content, the known constraints of the circumstances, and a higher level of abstraction in their work (Glaser, 1991, Voss, 1989, Larkin, 1985). These experts may infer certain key elements of problems which are not overtly stated (Glaser, 1991). In the simulation course the expert practitioners are, of course, the students who are, or have been, experienced school and district administrators. What constitutes expert knowledge and deep understanding on the part of experienced administrators differs more subtly from the knowledge of novice administrators than the knowledge of an expert physicist might differ from the knowledge a novice brings to solving a complex problem in physics. This subtlety is embodied in the fact that novice administrators have considerable school and community knowledge, while novice problem solvers in physics bring only a superficial observation of physical events to their task. But it can be said that, for the most part, the experienced administrators observed in this research did demonstrate a deeper understanding of the problems presented and, further, they were better at framing the larger, more substantial problems which were presaged by certain work session items or clusters of items. One of the most experienced administrators to take the course was Gene, who revealed this difference in perceiving problems and taking action:

> It appears from the comments of my classmates that I was inclined to "shoot faster" that they were in these instances; and that prompts me to consider the pros and cons of my stance. On the one hand there was evidence (albeit not first hand) that these people have acted in this manner in the past (and these 'negative' behaviors still persist). My action takes advantage of this information and pushes the matter to a head (and resolution ...) faster. (Gene, Journal)

As Gene's comments imply, the novice problem solvers often found themselves uncertain as to how they should proceed and what information might be important in finding an appropriate solution. Further, they sometimes did not think about important contextual information either within the school itself, or in the broader community and the school district. It must be emphasized that these findings must be considered tentative, given that this case study research was broadly focussed on simulation methods and experiential learning. Research focussed more specifically on exploring the differences between novice and expert problem solvers in the context of educational administration may add to our understanding in the future.

The desired student ability, then, is to find and display a deep understanding of the broader problems as expert problem solvers do, in the terms of cognitive psychologists, or demonstrate the process Vickers (1965) described as 'appreciating' the problem. Some students quickly revealed the ability. Sharon, who is, as we have seen, a practicing principal, was one:

> I am learning about different views of conflict resolution and am learning how to set up incidents which are multi-faceted. I think it is more effective to have a problem encased in another problem -- this provides

> more dimensions to resolve and is much more realistic. (Sharon, Journal)

This expression of the problem finding, problem solving process by Instructor One captured the essence of what had been observed in the performance of better students in the course over time:

> The most valuable things that they learn probably are related to problem solving, but problem solving understood in a very sophisticated way, because it's not as if the problems, kind of, are presented to you obviously with a little bow tied around them that says, "This is problem A, this is problem B, this is problem C." I mean problems come at people in our simulations in various degrees of their being obvious, and oftentime a problem in a given situation is only understood-- I mean it's only a problem because it's relatable to other things that you know about the situation, say other thing about the individuals that may be involved. So that, for example, it may be that patterns start to emerge, like, for example, a pattern that emerges with our Assistant Principal Martin Iwaniuk in the Pembina simulation. (Instructor One, Interview)

Students have shown this sensitivity to patterns, patterns by individuals, patterns amongst groups of staff members, and patterns in the cultural fabric of the school. They have demonstrated in class discussions how they see various situations developing and offered insightful approaches to dealing with them. Angela came closest to a direct expression of the process of 'appreciation' when she said:

> I think some people... are more creative in their different ways of looking at it or understanding it and just have -- they look at the bigger picture, as well as looking at the smaller picture to what is going to happen -- because I think that is a skill. (Angela, Interview)

However, in dealing with problem solving in the interviews, most students tended to think in a more immediate way although most were also convinced that problem solving was an important part of their learning. Earlier Elaine explained how she was beginning to think of problem solving in terms of helping others to solve problems and not feeling a need to take ownership of all the dilemmas of which she became aware. For a number of other students, the idea that problems might have more than one solution seemed to be important. Rita and Angela described it this way:

> I don't know if there is a right answer to some of those. I don't know. I think as teachers we're getting away from the one best way, and I don't really think you can say that there is one best way. It's just what you bring to the decision, how you act on it, and what the consequences are. And that's going to depend from one person to another. I would say in a case of a child's safety -- being in danger, or an injury -- there's one best way to deal with it. But for a lot of the other decisions, no, not necessarily. (Rita, Interview)
>
> As far as problem solving, I guess sometimes it's good to keep an open mind to be able to look at the different results that you might like and say, "Well, if I want that result how do I need to approach this problem in order to get it?" I try to look for the 'win-win.' That's where I come from. (Angela, Interview)

Angela went on to speculate further. Not only might there be more than one right solution, but the intent of the problem solver might have a substantial influence on the decision chosen:

> Anybody can solve problems, but it is sort of the level of where they are coming from -- like Hodgkinson talked about, being the poet, the politician, the technician, or the careerist -- where is their problem solving coming from? Like, what level? What is their intention?... Well, I think it is about what they think about. What their intention is. Why they are there. These are questions that I don't put in my journal. Why do people do these kinds of things? I think it must be their motivation. Why they want that and what their purpose is. What their vision of what they are trying to create is really all about. Are they in it for themselves? Are they in it for the greater good of most of the people? (Angela, Interview)

Other students had different concerns about problem solving. Werner thought that the type of problems being solved was important:

> This is the first time in the program that I have had to solve problems

> based on problems which require legal and legislative background. There is not enough legal and legislative background required in the program. Organizational theory is less important to us than conflict resolution. (Werner, Interview)

From another perspective, Susan thought that it was important to learn to implement approaches to solving problems in the hectic daily life of a school administrator:

> Well, I'm hoping to learn how to be able to, not necessarily solve problems, but initiate problem solving techniques on the spur of the moment, rather than having a lot of time to think about it ahead of time. Also being put into real life situations where you do have the interruptions and the phone calls makes it really more true to life than any other kind of simulation that you would have .... (Susan, Interview)

As a side note, one of the most interesting groups to consider in exploring the difference between novice and expert problem solvers is the few practising administrators who were consistently and significantly different from other practicing administrators in their analysis of problems and the solutions they proposed. While there were none of these people in the research groups used in this study, there have been three or four of them who have been observed over the decade of our simulation work, and they seem worth noting. These 'maverick' administrators also usually ended up outside the consensus which formed in the class around many of the items and the directions for their solutions. At least one of them took a highly autocratic approach. They also provide the core of the group of learners the instructors and developers have termed "active resister" (McIntosh, Maynes, & Mappin, 1989) to the pedagogical approach in the course. An active resister is a student who has a "clear, even shrewd, perception of the problems facing the school principal but is unable or unwilling to consider courses of action that differ from the tried and true methods arrived at on the basis of previous experience" (p.

275). Given an acceptance by the course developers and instructors that there is more than one solution to most administrative problems, and that most administrators make some use of their personal knowledge base and personal values in crafting solution approaches in their school it is particularly difficult to know what to say to active resisters that might be helpful to them. Further, differentiating whether these people are successful administrators who march to the beat of a different drummer and somehow gain acceptance for their actions, or dysfunctional administrators who have never been unmasked, is an enigma, an intriguing question which could likely never be researched for ethical reasons.

The last dimension of problem solving on which comments will be offered is the way in which the context or situation of the problem was understood by students and influenced their problem solving. As has been indicated, the experienced practitioners in the course gave consistent evidence of understanding the contexts in which they were working and the importance of those contexts. These were revealed in the course of class discussions and in the discussions of particular items as a part of the reflective journaling process. Some comments by Leonard and Michael provide illustrations:

> Throughout my many years working on reserves, I have encountered many, many cases of child neglect and and some cases of child abuse. All are heart-wrenching and exhausting to deal with. Through it all, the principal must use his/her experience, the law protecting children, the particulars of the community, and the individual families to address wrong and protect the rights of children. (Leonard, Journal)

> There was one other situation that I think also called attention to the fine line that sometimes exists between the responsibilities of the school and the responsibililties of the home and that had to do with a grade two student that Fluff has who is terrified to hand in work and became frantic

> at the suggestion that his parents might be called .... I know families like that and, from experience, I know that sometimes it is impossible to convince the parents that their child does not have the ability that they are convinced he/she should have. In this instance, however, if the roots of the problem are more cultural that anything else maybe Martin and I could organize some kind of group counselling. (Michael, Journal)

The inexperienced administrators also begin to demonstrate an understanding of the importance of situational factors as the course progresses. Once again the student journal entries reveal the development of their thoughts. Natalie was one of the younger course participants. By week seven of the course and the completion of the debriefing activities for the second work session, Natalie made the following observation in her journal, in which she wrote about the importance of situational factors in an elliptical fashion:

> Sometimes when we share we have to be cognizant of the fact that when someone relates a decision they made there were a lot of reasons which are not verbalized that influenced that person to act in the way they did. So, often we do not know the whole story or the whole picture right away until reasons are given. As administrators we have to be careful to allow for that valuable time to pass when we have evaluated a situation sufficiently to understand all the extenuating circumstances which lead to the path of events. (Natalie, Journal)

Joyce, also a novice administrator, but a somewhat older, more experienced teacher, incorporated an understanding of how important the context might be after her first work session experience and the debriefing:

> I also failed to identify the subsidiary problems. In a multi-cultural, diverse faith community such as Rutherford, there would also be diverse beliefs regarding sexuality and the teaching of values. Therefore one of my first and most important tasks should have been to find out exactly what were the components of the new program?, who would be teaching it?, how were these personnel being prepared?, did they feel qualified and comfortable?, had the parents been invited to discuss the program at

> orientation meetings? (Joyce, Journal)

As a final example, consider this more direct statement by Rita, another novice:

> You might be so centred when you get into your school, or have your school to run ... you might not be thinking of the bigger picture, and that's sort of in the back of my mind always now, you know. It's not just a school and that's the entire world. It's -- you know -- the whole community, and all the relationships, and the perceptions, and the public relation question, which you might -- you might not be as fully aware of this, if you don't have this chance. (Rita, Interview)

This evolution of a more complete understanding by novice administrators of the importance of context was definitely observed to emerge, as did so many other things, from the discussions in the debriefing seminars. The detailed exploration of the facets of various problems, particularly through the contributions of experienced administrators, invariably widened the novice administrator's perspectives.

Learning Improved Judgement

When the students set about exploring judgement and learning to make judgements, perhaps the most interesting question that emerged was exactly what the nature of judgement is, and whether or not it can be taught. The contradictions in thinking and values that Gene expressed in his interview regarding judgement provides a gestalt for several student responses:

> But to me it's more judgement -- intuition. It's taking action that you see appropriate. It's probably influenced by your study of theory, but I think an awful lot of administration is the administration of judgement. It's weighing the elements of the circumstance and applying an appropriate course of action to it.... Yes, you do. You learn to make them. You learn. But I think some people have good judgement. I'm thinking now as a superintendent. I've got a number of principals appointed and I guess they have learned it. I don't know, but they have it. They may not have any academic or theoretical courses. I appoint them. I know they are

> going to do a good job and they do. I've got other people -- they've taken a Masters in Ed Admin because they want to crash into admin, but they'll never be a principal in my system because they don't have judgement.... I like to think you can learn judgment, but I don't know if you can teach judgement. I think you can but I think there must be limits.... I'm thinking about my two kids. One has had judgement since he was that high. We used to throw him in war games and things like this: and he'd do really well, but he just has had good judgment ever since he was a kid. The other kid is not bad, but he just doesn't have the same amount of judgement. I think you could offer him programs the rest of his life and he still wouldn't have that. I don't like saying that because it means you can't teach him.... Yes, but I don't like that [*a genetic basis for judgement*]. I fight against that idea. But I don't know. Okay, maybe if you are going to teach it at all, if you are going to have any success, it isn't going to be in theory, it is going to be in courses like this ... I think that some people, I guess just like IQ's, some have higher IQs, some of 'em haven't. Maybe it's development IQ, but some people are able to -- they just have the mental capacity, if you want -- to identify the important elements in a situation and to give them the appropriate weightings and decide on an appropriate course of action. Now I'm not saying they can't improve through teaching. I think they can. Some people don't have that and maybe you can improve them, too. I don't know. I think if they don't have that basic ability to see the elements of a situation and weigh them appropriately, you are never going to make a top administrator out of them. (Gene, Interview)

Other students, such as Larry, expressed similar thoughts without talking through the thinking process:

> I don't know if you can learn judgement, but you can learn to be sharper in your judgements, maybe. Some things -- you can't make a judgement until it's actually there, but if you have had something similar, it helps you walk through it. It gives you more confidence in how you are going to deal with it. (Larry, Interview)

Although they were not sure of whether or not the basis for judgemental ability was learned or innate, most students were sure that it had a base in experience and could be improved through experience. Here is what Angela, Rita, and Elaine said about learning judgment:

> Making judgments about things really needs to come from experienced places in my mind -- whether or not we get it in actual hands-on, or through the literary world where we can see what the results are after a certain judgement or a decision has taken place. (Angela, Interview)

> Dealing with people. Simply. As a teacher, with these ideas of coming and doing this, I saw that as the key. Dealing with people. And every experience, every exposure to every kind of person, and simply that. (Rita, Interview)

> So I guess an answer to your question, "How do people learn to exercise better judgement?", I think your observation, reflection and growth, which is what's been promoted throughout this course, with the journalling, is excellent, causing people to really think about what they have done. (Elaine, Interview)

When students talked about what they were learning about making improved judgements, it was often couched in terms of improved 'decisions', and they talked repeatedly about learning the import of their personal values and their moral positions in influencing the judgments they made.

The importance of personal values in their thinking is shown by the following thoughts which Gary, Leonard and Lisa entered in their journals:

> I have been amazed at the amount of administration that is value-related. A perception I had of an administrator is one who kept things well-organized, made timetables, assignments and did a lot of technical things well. Since being involved I see many of the situations which arise are deep-set in values and good intentions.... The nature of the principalship depends upon having a strong belief in what you are doing and the values you uphold. (Gary, Journal)

> So often during the various scenarios, I found myself thinking about where I stood on some of the issues. It became quite apparent if I didn't know what I believed in, how could I even expect to provide leadership to others. (Leonard, Journal)

> This year at school has given me some wonderful insights. I have more of an idea now as to what my personal philosophy of educational

> administration is, though I admit it changes slightly on a regular basis and I have to keep updating it. I have determined that, for me, my value system must be at the forefront of any decision-making.... Throughout this simulation, I am going to continually ask myself if I am basing decisions I make on the values I know to be true for me. The underlying value for me will be to treat all people with dignity and respect. (Lisa, Journal)

Thinking about their values and the moral dimension of their judgements was prompted by some of the readings assigned in the course and through some class discussion. Among the most influential of the readings were sections of Sergiovanni's book *The Principalship* (1991). Lisa described how it reinforced her thinking in this way:

> I began reading Sergiovanni's *The Principalship*. When I first picked it up I looked at the Table of Contents. As I was going through it, I noticed the last chapter entitled *Administering as a Moral Craft*. I read it first. Interestingly enough, after I read it, I went back and started at the front with the Foreword. The Foreword encourages you to read the last chapter first! I was right on track. Even more interesting was the fact that I had already written the first part of this journal regarding people skills, knowledge, and wit. I now notice the parallel to Sergiovanni's heart, head, and hand in leadership. Teaching and school administration are moral crafts that must be seen as such by all. (Lisa, Journal)

Other students found similar inspiration in other readings. Leonard commented on how an article by Fullan and Hargraves impressed him:

> Fullan & Hargraves [*What's Worth Fighting For?*] talk about the need to take time to listen to our 'inner voice'. Our values and reflective thoughts are often put aside in the rush of trying to carry on the business of teaching. Time must be taken to "remind ourselves what values and goals are most important, what frustrates us most, and what we stand for." (p. 66) The inner voice, say Fullan and Hargraves, must be listened to and communicated to our colleagues.... I had put aside what should have been the most important part of my work for the rush of trying to carry on the business of teaching. (Leonard, Journal)

We can see that the quality of judgement and its improvement was on students' minds during the course, and they believed it could be improved. The improvements would come through reflections on experience over time, but for many students there was a stated belief that one had to have some sort of fundamental ability to make judgements in the first place. Whether or not this fundamental ability was innate was something on which there was no consensus, not only amongst members of the class, but also within individuals as we saw with Gene. Perhaps the course developers and instructors could be satisfied if each student was able to reach the level of evolving understanding exemplified by Elaine:

> An effective administrator, and a good administrator, exercises judgment, but is not afraid to admit error, or to go back and check, and to remake decisions in light of information. Linda LaRocque said that to me. One day I was going crazy with everything. I said, "You know the work, I love the work, but the people are driving me a little crazy." And she just said, "But it is the people who are the work in administration." And I thought, "That's it. I've been missing that." And I think this teaches you that the people are the work. You have the in-basket and you'd love to do all the items, but when people come into your office, or you have phone calls, then that's really the essence of your job. It's the relationships with the people, and exercising not just good judgement, but human judgement.... (Elaine, Journal)

Learning To Be a Reflective Practitioner

Another dimension of learning which this research set out to explore was to gain an understanding of how a relatively unskilled novice becomes a skilled reflective practitioner. If one reviews the student journals and interviews, there are several comments which students make with regard to how they believe they will move from novice to expert. Their observations were certainly influenced by the readings in the course, the theoretical position on learning which has been adopted by the course developers, and comments made by the instructors. Among the ideas in the readings in the course which bore on becoming a skilled practitioner were a sense of highly developed intuition (Sergiovanni, 1991; Fullan and Hargraves, 1991), reflective practice (Sergiovanni, 1991; Schon 1983, 1986), and principals as mystics, neats, and scruffies (Sergiovanni, 1989). Sergiovanni's idea of mystics, neats, and scruffies as administrator types found a great deal of resonance, and everyone wanted to see themselves as a scruffy.

The one theoretical position of the course developers to which students are exposed explicitly is that of experiential learning as presented by Kolb (1984), and discussed more completely in Chapter Three. It is presented in a short essay on experiential learning in the Student Handbook each year. Embedded in Kolb's ideas is Kurt Lewin's model of experiential learning with its cycle of observation and reflection, formation of abstract concepts and generalizations, testing the implications in new situations, and undergoing a period of additional experience. At this point the cycle begins again.

The instructors in the course also have an influence on student perceptions, and for the most part they present their interpretations of experiential learning and course readings. This primarily results in reinforcement of ideas in the essay on experiential learning in the Student Handbook, and the ideas in the course readings, as the instructors are both members of the development team, and have been involved in the selection of the readings. Additionally, many students and the instructors are familiar with the work of Donald Schön, so ideas of reflection-in-action have become a part of the lexicon of course participants as well.

If we begin by examining statements made or written by students who have had no experience as an administrator, neither as a department head, a vice-principal, a principal, nor as a superintendent, their comments show an effort to put themselves into a role to which they aspired. Joyce, for instance, made this observation after the first work session:

> This is where I truly see the application of Sergiovanni's reflective practice model. Even though I see the impossibility of applying a ten-step model of evaluation to each decision an administrator makes, just as there would be little time for using such a problem-solving model in decision-making, "good" administrators must internalize key elements of both in order to be reflective practitioners. (Joyce, Journal)

In analyzing her performance in that first experience she reflected on her actions in the following way:

> Just when I felt that I had developed a game plan for dealing with the lab situations and the telephone calls, I was brought back to reality. In trying to be more rational, more organized, and better informed, I became a Neat, someone who thought that if I had enough information and theory, I could prescribe my practice. I forgot that I needed information to inform, not to prescribe my practice. (Joyce, Journal)

Joyce made progress on a number of fronts which were duly recorded in her journal. Towards the end of the course she described how she felt she was operating:

> Now as a true Scruffie, I see my real-action episodes interacting with my reflective opportunities and beginning to characterize my professional practice. I like Sergiovanni's quote: "Professionals rely heavily on informed intuition as they create knowledge in use." (Joyce, Journal)

Another neophyte administrator, Phillip, found that journalling helped:

> I'm finding it easier to be reflective than I did at first. It seems that by writing thoughts down it really helps to formulate them more clearly.

> When I mentally reflect, if there is such a thing, I will usually do it in fleeting thoughts. Too many interruptions prevent complete reflections from developing. (Phillip, Journal)

Phillip went on to talk about the major problem of learning reflective practice, one which students often expressed:

> What I've said though illustrates the problem with reflective practice. It's too easily given up for more pressing things in the "heat of battle." I think that I'm a reflective practitioner (of teaching), but is it too fleeting? In all honesty, as a new principal I think that the first while would be spent learning how to survive, just like a beginning teacher, and there would be precious little time to reflect. I wonder if one could say there are stages in reflective-thinking development -- that you become more reflective as you become more experienced and comfortable in the position. Then again, the very process of learning to survive has to involve some degree of reflection, otherwise the person would not be successful in that struggle. And perhaps when one starts to feel comfortable in a particular position, that is when reflection is most needed, so that comfort doesn't become confused with stuck in a rut. (Phillip, Journal)

However, the habit of reflective practice begins to build in the students. Angela felt that it showed up when she did not expect it to inform what she was doing:

> Much of the learning, however, can not be captured in journals like this, but shows up at the most unexpected times in our daily interactions in the administrative world. That to me is true education.
>
> I have truly enjoyed and learned from this experience. It fits so well with many of the other administrative classes that I am taking. It basically gives me a place to put my philosophy into action and then to examine, reflect and revise upon not only my thinking, but also my doing. (Angela, Journal)

The inexperienced students also grew in confidence as they worked towards a personal model of reflective administrative practice. Joyce summed up her experience this way:

> I see it, however, as more, as a wonderful opportunity to continue my growth as a reflective practitioner. I am being very sincere when I say that even though I have had the privilege over the past two years of

> learning from knowledgeable and capable teachers in practical and useful courses, this simulation course has finally allowed me to put into practice what I've learned and what I believe in. I am committed to life-long learning and this course has given me the tools necessary for this process. I'm looking forward to my continuing journey to combined action and reflection. (Joyce, Journal)

As a final example, perhaps the best possible choice would be Susan, who was one of the students with the greatest insecurity and self-doubt. Towards the end of the course Susan wrote the following entry:

> What an uplifting experience to be in control of your mindset! I truly am starting to feel ready to try this in a real-life setting. The fact that I felt comfortable not satisfying Mr. Wanetchko's demands is a sign of progress. Last term I would have fretted for weeks over the fact that he sees me as inept and incompetent. (Susan, Journal)

At the end of the course Susan was able to announce that she felt she wanted to try for an administrative position and that she felt fully capable of handling it.

It was not simply the inexperienced administrators who felt the combination of simulations, seminars, tutorials, readings, and journaling helped them become more reflective practitioners. Three extracts from Larry's journal, one from the first page, one from about mid-way, and one from his concluding insights, illustrate how his actions in this course helped confirm reflection as something of major importance for him. In his first entry, he was intrigued by reflection but concerned about finding time for it in his regular hectic world as a principal:

> With our ever changing times and busy lives, much of what I now do, or don't do, just goes unnoticed, that is, I do not have or take the time to do any reflection. This mode promises to force me to reflect, discuss and even learn in a "true to life" scenario. I have some theoretical background and ample opportunity to "act," but this idea of being able to reflect and discuss on the what, hows, and whys of our actions and

> decisions appeals to me.... One of the weaknesses in my role (somewhat of my own making but not totally) is the lack of time and opportunity to sit and chat with colleagues on topics of common concern or strategy, time to reflect.... (Larry, Journal)

About half way through the course Larry found his reflections in the course were beginning to affect the administrative tasks he undertook everyday:

> It is interesting how reflecting on Pembina draws me into a more focused reflection of my own school. I'm looking for ways to implement the ideas I'm deriving from the simulation into practice in my real world. (Larry, Journal)

At the end of the course, asked to provide some unifying strands of insight into the principalship as part of his closing journal entries, Larry made this highly enthusiastic entry:

> My second insight? Reflect! Reflect! Reflect! Pull away, stand afar off! Get a better perspective, the "whole picture!" Learn! Adapt! Move ahead! Show success! then Reflect! Reflect! Reflect! (Larry, Journal)

In the midst of their enthusiasm, though, students tried to be analytical about the implications of reflective practice. At one point a few weeks after the course had been running and he had been exposed to ideas of being a reflective practitioner, Gary, a student who had spent three years as a vice-principal, offered this caution about reflective practice:

> Introspection is good, however, over-introspection will drive you crazy. I think it is important to be a reflective practitioner, as long as it is resulting in growth. However, I also feel it is important not to become an over-reflective practitioner. If you look in a mirror for too long you will start to see blemishes and imperfections that no one else will ever see or care about. (Gary, Journal)

Gary wrote more about reflection in his summative journal comments on the course:

> The principal needs to have vision and be reflective about this vision. You should know where you want your school to go and some ideas on how to get it there. You need to reflect upon this vision and continually analyze this vision. You need to think about how you are going to do things and handle situations. Once done, think about what you have done and how it has worked. Ideas, directions and even values change in society. We must be aware of these and be prepared to analyze and think about them and how they might affect the school. The staff needs to be encouraged to think about their values and how they relate to the school. To me, all decisions you make are laden in values and guided by them. Often not "What is the decision?" but rather "Why this decision?" is the important part of being a principal. As a result of this course I really do feel I am much more aware of the "reflective principal." I was doing it before, but am much more aware of it now and the processes behind it. To my closet of different hats I have added a "REFLECTIVE HAT." It's an important one to have. (Gary, Journal) (*emphasis in the original*)

Course participants seem to take the position that reflection must become internalized, become a part of how a principal works. They must seize brief moments to use their insight, the links and structures in the mind, gained through experience, study and thought, to reach better quality solutions. The result of this process may be the creation of the sense of intuition which Benner (1984) has described, or Schön's or Sergiovanni's approach to reflection-in-action, or the evolution of Fullan and Hargraves' inner voice. In his journal Leonard uses a work session item dealing with potential child abuse to launch an introspective analysis of a similar incident in his administrative life, one where he was inclined to be highly critical of his actions. At the end of his analysis Leonard suggested how important a process like this must become:

> Our values and reflective thoughts are often put aside in the rush of trying to carry on the business of teaching. Time must be taken to "remind ourselves what values and goals are most important, what frustrates us most, and what we stand for" [*Fullan & Hargraves, 1991*](p. 66). The inner voice, says Fullan & Hargraves, must be listened to and communicated to our colleagues. The learning incident described above

> is both frustrating and shameful. I had put aside what should have been the most important part of my work for the rush of trying to carry on the business of teaching. My inner voice tells me I've made a mistake that I will not soon repeat. (Leonard, Journal)

In the final analysis, of course, it would be necessary to do a longer term follow up study to try to determine if those who had taken the simulation course were able to internalize the reflective process nurtured during the course and transfer it into the chaotic day to day world of a practicing school administrator. For now, students seemed to be saying that the process helps them understand how it may be more possible to undertake reflection in action.

Student Comments on How They Learned in the Simulation Course

How students were learning was of interest in this research, not only in learning judgement and problem solving, but in all aspects of learning by students during the simulation experience. This question was pursued in interviews by asking students a series of probing questions related to various course activities. These elicited the insights into the debriefing seminars, tutorials, readings, and journaling which have been discussed. Two more direct questions were also used. The first was: How are you learning what you are learning in this course? The second: What was the most difficult item for you, and why?

Student responses to the first question were consistent, both between the information sources available from individual students, and from student to student. The two factors which students identified were the comparison and contrast which the class discussions of simulations and the readings promoted, and the way that reflective journaling allowed them to think in both integrating and expanding ways about their simulation experiences and about their reading about the principalship. In both cases the evidence of integration into their views of themselves as administrators, and transfer into their "real-world" professional lives was substantial. Responses from Angela and Gene exemplify the information typical of the interviews, less overtly stated in the journals, and often informally stated in conversation with students:

> I am learning how to, I think, take the learning that I've had at the academic level at the university, or leadership courses that I've taken, and how to apply some of those things here in these little simulations and listening on the telephone. And also how to take that and then apply it at my work because I do a lot of dealing with parents and get lots of phone calls, lots of irate things going on -- strange happenings and transfers. So that I would say there is a lot of transferring through this class from the world that I work in to the world that I do my studies in. So, this is something that really kind of facilitates a flow for me in regards to knowledge and practical application. And yet -- still the reflective part and the philosophizing about what it is I am doing and why I am doing it. And what are my feelings behind this and what are my beliefs and what does this mean for me? It really gives me an opportunity to connect my two worlds in a very nice way and I quite like it. And the cameraderie and the sharing of experiences, I think is the greatest learning that I have got from this. (Angela, Interview)

> There are two elements in the course that I am learning from. One is the journal.... What I've learned to date I picked up a lot from just reading and writing in the journal. No! It isn't all from reading. Some of it is from class discussions and the simulation itself. I think the simulation is more -- it prompts questions.... But where I think I really pick up from are the discussions after the in-basket.... To me that is the real meat of it. To be able to find out how other people react to those issues, although in real life when I get faced with this situation I make a decision.... I could go ask my assistants, or somebody, and say, "Here is the situation. What would you have done?" But those guys don't live it. It really isn't an issue to them so they give you an opinion, but it's off-the-shoulder. Whereas, everybody in that class, they had to deal with that issue like it was important to them, so I'm not getting off-the- shoulder reactions from them, and I don't get that in real life. There is no way I ever get that.

> Whereas, in class I can. So what it does, I guess -- It lets me look at what I'm doing and I get a lot of perspectives on how other people would deal with that problem, and from that you can get an insight into what you are doing and the degrees of correctness of your action. Whereas, in real life you don't get the degrees. You just know that one was okay or it wasn't okay. (Gene, Interview)

Rita made similar comments, and when she was asked, in a supplementary probing question, if she could have learned the same things through shadowing a principal she offered the following:

> Right. But following someone around is not actually being involved in the decisions. They're still making the decisions and you're not. You're just sort of watching and seeing the consequences and all the elements that went into the decisions. You're not actually doing it. (Rita, Interview)

When one reviews the responses to the second question regarding the most difficult items, another interesting finding emerges. Again, the items students found most difficult were very idiosyncratic. When the responses are considered in the light of the totality of the interviews and the journals, the items students found most difficult were ones which they perceived to be closest to the areas where they felt weaker and challenged personally, and those items which touched on stress points in their everyday lives.

To illustrate how perceptions of difficulty related to views of self, consider the revelations which Larry, Rita, Susan, and Angela shared. Each of them discloses some aspect of dealing with people or tasks in an administrative environment which makes them uneasy or uncertain. Larry, for instance, found having to confront a teacher most difficult, particularly in a circumstance where the long term prognosis does not seem good. In one of the work session items students must deal with an item where a parent, Dr. Roland Short, has alleged that one of the teachers, Keith Dawson, has physically assaulted Short's son during class and given him a concussion. Larry described his difficulty in having to investigate an incident which puts him at odds with a teacher:

> Probably the one with Short where I had to go down and talk to Keith. I don't like that sort of thing. It irks me that it would happen, but it did. The others -- I think there's hope and there's something you can do about it, but Dawson is going to be a lot of hard slugging in the future to deal with. Sort of a mental attitude that is added onto that one. (Larry, Interview)

Rita found two items most difficult for her, revealing how upsetting she found dealing with angry, obnoxious people, and secondly, how insecure she felt in dealing with budget matters. In the following quote the computer problem is self-explanatory, while the phone call from Anna Boelman refers to a telephone call each Stacey Metzger must deal with from a community busybody demanding the new principal take action on allegations of racist name calling amongst the children in the past few days, and irregularities in the hiring of a kindergarten aide the previous year:

> Two come to mind. Computer -- budgeting for the computer, and Anna Boelman, the phone call.... First of all, the phone call. I found the caller so obnoxious, and I was trying my best to be polite and considerate, and she wasn't at all. And I was just, like, well if that's the way you're going to be, I don't even, you know what I mean, don't even want to be carrying on the conversation. But, of course, wasn't able to do that, or didn't say that in so many words. So that was kind of disturbing, because I thought that this woman just needs to vent her anger, and unfortunately, she is venting it on me. And as far as the computers... I knew the problem -- that they had been budgeted for, then the enrolment was now down. But because I wasn't aware if they were already in use, or what the status of them were -- are they still in the boxes, etc.... And then some said, well, afterwards, the term was 30 days you have to pay this invoice, and I hadn't noticed that on the invoice. And so I just -- I couldn't think of anything, you know, where to get the money from, or how to solve that, and I guess that was because of my general frame of

> mind .... (Rita, Interview)

For Susan, the difficulties expressed seemed to mirror an extreme lack of self-confidence, something which was not warranted given Susan's demonstrated abilities during the course:

> I'm trying to remember any of them. [*She giggles nervously.*] 'Cause I did go in very, very nervous. I find the phone ones difficult, in general, I think, because you're having to think on your feet and they can carry on with that.... I found those difficult.... I found the budget one difficult, in the idea that I felt I lacked knowledge, myself, to make a decision. Actually, I was unsure about all of them, pretty well -- whether or not I was doing the right thing, or not -- to say one over the other -- If I had my list here I could probably -- I found, like I found them all the same, overall. I found -- I found that I didn't know that I was sure of any of them, really. I was just sort of in cruise... But the phone ones were definitely -- I found those difficult, in that you don't know what's coming at the other end. (Susan, Interview)

A general dislike of having to act without complete information characterized Angela's choice of her most difficult problem:

> I'm not really sure what would be the most difficult -- maybe the one that I didn't have that much of an idea what it was about. That one where I asked that lady to -- I phoned and I told her to tell me what she was talking about. When I don't understand something, then it's difficult. And that other note that I got from that lady with these strange things going on in the playground. I wasn't really totally clear on that one -- at least I don't think I was.... Yeah, mostly because I just didn't feel like I knew I had enough information there to know what was really going on. (Angela, Interview)

Other students found simulation items difficult when they collided with their lives. Elaine had been providing support to a battered wife in her school and the degree to which that had been affecting her life was brought home very abruptly in work session two:

> It was the wife battering one, absolutely, because I did have a personal reaction to that. It was no longer a pretend world. It was my real world coming in, and a part of my job last week was to get rid of that. I had just come from -- it's been like this -- she's going to a counsellor. The counsellor phones me to let me know so that basically I can sleep and lay off. If she's not going to the counsellor then I have to keep the pressure up by asking questions, like: So how was last evening? What did you do last evening? Have you talked to Irene lately? I have to keep the pressure up in that way, or I feel we have to keep the three of us working on her, and it's stress. I didn't realize how stressful it was until this guy comes through the door, and my reaction is, if I had a gun I'd shoot him, I would just absolutely shoot him! What I heard Martin say at the beginning -- my heart's with Martin. This kind of stuff really bothers me.... (Elaine, Interview)

Whether it is in those areas where students feel most challenged by a perceived lack of skills or personal tools, or whether it is coming to an understanding of how events in their "real-world" administrative life are affecting them, this dimension of the course adds to the highly individualized learning students are able to achieve in this course. It provides further support for the pedagogical approach used in this course and further incentive to examine how both the method and the simulations might be improved.

Chapter 7

Some Ideas Emerging From This Research

The research done in this project has served to confirm the general impression of the course developers of the quality of the course, to provide additional insights into the development of educational administrators, to illuminate aspects of student learning, and to provide information which might be used to create an improved series of simulations. In this chapter a recapitulation of key ideas which emerge from this study and how they might inform future practice is undertaken. The presentation of this information has been organized around the research questions posed for this study.

On Becoming a Skilled, Reflective Practitioner

One of the questions of central interest in this study concerned how administrators become the best practitioners they can:

> *How has the experience with the simulation course informed our current understanding of the process through which an administrator moves from an unskilled, or novice position to that of a skilled, reflective practitioner? To what extent can this be related to activities which are possible within a graduate education program, especially those involving simulations?*

This study and the literature suggest that the most important elements in learning to be a skilled, reflective practitioner are experience, and a thorough understanding of a broad range of concepts and ideas through which the experience can be interpreted. The literature on expert problem solving discussed in chapters 3 and 6 underscores this point. Experts look at and interpret problems differently and they use the breadth and depth of their experience and theoretical knowledge to do it.

In thinking consciously about being a reflective practitioner the ideas most commonly expressed by students included the ideas of Sergiovanni (1989, 1991), and Schön (1983, 1987), which convey concepts of reflective practice and related ideas of reflection-in-action, leadership vision, and ethical and moral practice. While these authors were very much discussed and, in a certain sense, very much in fashion at the time the study was undertaken, student preference for them probably has more to do with the resonance they felt for the ideas than with any other factors.

For the most part students expressed hope to become effective principals, and for them this meant enacting many of the ideas which Schön and Sergiovanni described. In part, these students wished to become practitioners who have internalized the process of reflection-in-action (Schön, 1983, 1987). The evidence presented throughout this dissertation would support the assertion that the design of the simulations and the other activities in the course permit students to begin the process by stopping the flow of events in which they are engaged to think about what they are doing and how their actions fit with the vision they are creating for their school. They can then continue with their actions or go on to the next problem. Further, they have another chance to consider what they have done in the debriefing seminar, contemplate it while journalling, and to adjust their thinking before the next work session. This cycle is very like that of the Lewinian model of learning from experience presented in chapter 3, a cycle in which an experience is followed by a period of observation and reflection, the formation or adjustment of abstract concepts and generalizations, and the testing of these new concepts in new situations. By repeating the cycle for more than twenty items in each work session, and doing three work sessions in the course of a term, seems, in constructivist terms, to permit students to build knowledge structures based on experience, reading, and discussion, to build links between the relevant portions of that knowledge, and to strengthen those links through repeated use. If this were indeed happening, one might look for evidence that students were acting in this way, and were aware of what they were doing. A few students illustrated some understanding of this process in their own learning. One of the teachers enrolled in the course, Joyce, described it this way:

> One of the major benefits of a course such as this is that the learning is immediate. Practice is occurring at the same time as reflection on the practice. Being able to practise decision making and communications skills in a real situation, but at the same time to be able to stop the process and reflect on it, perhaps change your mind, decide why you did what you did, is a powerful example of learning in action. (Joyce, Journal)

Further, repetition should strengthen the links between scholarly knowledge, experience, and action, while expanding that knowledge and experience at the same time. As the practice was habituated in the activities studied here we might expect to see students undertaking the cycle of reflective practice more rapidly and feeling confident in their ability to quickly consider their options and the ramifications of their actions. Evidence of evolution of thought, such as that quoted from Larry's journal in chapter 6, shows definite shifts in attitude from the beginning of the course until its end. The always thoughtful Gene provided some insight into how the cycle reverses traditional postsecondary pedagogical practice, and involves the elements of situational learning:

> I guess what the simulation does, it provides you with the real life setting and then you are working back the other way, and saying, "How does theory apply to this?", or, "So, I did this in this real life situation. What am I really doing here?" And you start looking at the theoretical background. I think both ways are valuable but I think that just about all our courses you run into from a theoretical point of view, where you have

> to apply theory to practice. This comes from the other direction. It's refreshing and I think it should be an even balance, so we should do a lot more of this kind of courses. (Gene, Interview)

Also in chapter six, there is ample evidence of students pursuing a goal of reflective practice. However, while these students' attitudes and efforts may well contribute to their ultimate success, they do not guarantee it, or demonstrate that it has been achieved. In fact, given the complexity of the simulation environment, the nature of the problems, and varying student motives and approaches, it would be nonsensical to say that because students were working through the simulation more quickly they were becoming better reflective practitioners. While it is true that students wished to become reflective practitioners, and that by work session three they were consistently working more quickly in the simulations, this increase in speed could easily be attributed to several other factors: facility with the computer interface, familiarity with the types of problems which would come their way, or a realization that they could delegate a much higher percentage of the items and consequently not have to write as many detailed explications of their approaches.

Nevertheless, this researcher has become convinced that the controlled cycle of action and reflection in the course is useful in helping students to learn reflective practice. The students' ability to rehearse approaches to different types of problems and to practice their actions in an environment over which they have some control seem to contribute in a substantive way to learning to be a skilled reflective practitioner. Evidence that it can make a contribution to this learning which persists for longer than the duration of the course will have to await another research study on the longer term effects of learning from simulations. There is also the question of how (and, perhaps, whether) learning to be a skilled, reflective practitioner can purposefully be undertaken in graduate programs with a reasonable hope of success.

Learning to be a skilled reflective practitioner in a graduate program in educational administration. With regard to the course as a whole there are four implications for overall course and program design which emerge with reasonable strength and clarity from student comments and research observations. The first of these is that while this simulation activity seems able to replace work experience for student administrators and thus provide the foundation for a very valuable learning experience, it should not be thought to replace other experiential components of a graduate program, such as the on-site experiences afforded by an internship or reflective practicum. The strengths and weaknesses of these types of experiences and simulations were compared in Table 3:1 in chapter 3. A stronger program would result from considering all three of these activities as complementary tiles positioned near the top of an imbricated program structure. Student comments in their journals indicate that the validating experiences of the other courses they take are important components in the learning they do in the simulation course and in their development as administrators. Phillip's comment at a point in early March, more than half way through the term, was typical of comments made by several students in this regard:

> I'm finding the combination of this course and 531 [*a graduate course on the administration of schools*] with Margaret to be extremely beneficial. I'm getting the opportunity to see other principals in action as well as explore my own reactions in the simulation. It's really helping me come to grips with what my philosophy of administration is. I don't think that

> I'm able to articulate it just yet, but the picture definitely seems to be firming-up. (Phillip, Journal)

Discussions in the previous two chapters illustrate quite clearly the unique learning experience of both novices and experienced practitioners as students in the simulation course, especially through seeing alternative perspectives on the same problems which involve the same individuals. These experiences permit both significant, individualized personal growth for each student in areas which are important only to them, while also serving to provide an important integrating experience for bringing together their conceptual learning as well as their vision, values, and beliefs about the principalship and schooling.

From this emerges the second implication, that a simulation course is best positioned towards the end of a graduate program. While the instructors and developers have always maintained that the course could easily fit either earlier or later in the program, student comments would seem to confirm the strength of the integrative aspect of the experience if it comes towards the end of their studies.

Thirdly, the recognition of the degree of idiosyncratic learning which students derive from this experience should be given more attention. In my opinion this would best be done by devoting time early in the course to some enhancement of discussions of reflection and, in particular, reflective logging, through the addition and integration of some ideas of metacognition. This will be discussed more fully in the section on student learning in the simulation course later in this chapter.

The fourth and last implication related to overall course design/program design issues is that students need to learn more conceptual knowledge and additional generalized technical skills regarding school-based management and, in particular, school-based budgeting. Students from jurisdictions other than Edmonton Public often wrote of knowing nothing of school based management as, for example, did Susan, Ingrid, and Natalie:

> As I was looking at the budget I couldn't remember enough of the codes to remember who had what amounts of money. -- And do you mean about the spreadsheets? I couldn't tell by looking at that where it might be a possibility of cutting back [*sic*].... So I kind of, didn't have a chance to look at that -- and from my own background I don't have any knowledge as far as budgets go, especially school based budgets, 'cause we don't have any in our system... (Susan, Interview)
>
> Will I be accountable for these decisions in later simulations? For example, the budgeting problem of 15 less students than projected and a bill for ten new computers. I honestly didn't, and still don't know what to do about that one. I want the computers but I need more ESL time too it seems. And I don't have as much money! Should I go into my budget and take money from somewhere else? Where? I don't know enough about budgets to know the areas where I can cut back without drastically changing my school. (Ingrid, Journal)
>
> The class certainly gave an interesting overview of school-based budgeting. The concept of giving principals and their staffs decision-making powers not only gives them freedom but, at the same time allows the schools to understand how complex a matter it is to sometimes to introduce a new program or purchase equipment. I have never had the experience of being in a school where this sort of system operated. I was fascinated in hearing those teachers who are, discuss the priorities and budget concerns they had. (Natalie, Journal)

Similarly, students from Edmonton Public with no administrative experience also seemed to lack an adequate understanding of what school based management might mean for their vision for, and management of Pembina Elementary school. Even students with administrative experience were concerned about their budget skills, although they recognized the important correlation between school vision and budget allocations. Steven was one such practicing administrator:

> There was a time in the not to [*sic*] distant past when school principals were "just school principals." Now one more dimension has been added to that person's role, "financial manager"....
>
> My present school is not on a "total school based budget." The only element missing is the "staff salary" which is controlled by central office. This experience has, however, been more than adequate as more and more financial responsibility has been transferred to the principals in recent years. I personally do not have a great deal of expertise with finance, budgets, etc. and thus I have to spend an inordinate amount of time on it.... In essence the school budget becomes an accurate reflection of the school's goals and plans and thus should encourage more staff to take an active role in "budgeting and planning." (Steven, Journal)

It is noteworthy that the items in the simulations which required budget expertise were ones which the majority of students consistently seemed uncertain how to handle, stimulating the current course instructor to add a brief tutorial on school based budgeting. This instructor also mused about the need for expanded attention to budget topics within the course:

> Now something that would be interesting sometime or other, would be for us to pilot a one year course, a full year course, based on the simulation and to build in more exposure to school based budgeting, more tutorial work... (Instructor Two, Journal)

The problem with handling budgets in simulations for educational administrators is not confined to the Pembina Elementary School simulation. For example, O'Leary (1994) in an American setting, and Mortimer (1994) in a British one, both mention impact the lack of financial training and budget understanding had on some students working with simulation materials developed for use with educational administrators.

Given the current orientation of Alberta Education in encouraging site based management throughout Alberta, and the attention that site based management has received across the continent, properly addressing budgeting and financial management would seem important for any administrative simulation, and for any graduate program in educational administration as well.

What Are Students Learning From the Simulation Course?

A second research question in this study addressed student learning:

> *What can we discern about what students are learning in the simulation course based on the Pembina Elementary School simulations? What facilitates this learning? What gets in the way?*

Students expressed interest in a variety of concepts which embody the leadership qualities each thinks important. Questions and observations in this study focussed on the broad topics of learning problem solving, learning judgment, and developing an ability to be a reflective practitioner. Becoming a reflective practitioner has been addressed in the previous section but the other two topics also bear examination.

Problem solving. Addressing the complex ill-structured problems which comprise the majority of the problems which confront a principal has several aspects which have been of particular concern in this study. Being able to "appreciate" the real problem, the existence of multiple solutions to most problems, the intent of the problem solver, and the importance of situational factors are all seen to potentially influence effective problem solving in schools. The last three of these were observed to be the most easily understood and used by students. The idea of truly understanding a problem in its full context in the school, district, and community, however, is a dimension which is not understood to the same extent.

As has been discussed, many of the simulation students do not see the broader implications and larger problem context for many of the discrete work session problems which are presented to them. While the idea of truly understanding a problem is discussed in class, and the debriefing seminars provide concrete examples of how a seemingly minor incident may be intertwined with other issues, many students do not seem to be able to internalize the skill which will permit them to "appreciate" a problem, as Vickers (1965) would put it. Clearly, more thought needs to be given to how these students can be helped to develop this skill. Two possible approaches are thought to have some potential in this regard. The first is providing students with some information about how experts solve problems, and the second is to provide them with some heuristic metacognitive techniques which may help them develop some insights into their problem solving process. These two are seen to be inter-related inasmuch as the experience and thorough knowledge background which an expert brings to a problem solving task are informed to a great extent by the four metacognitive heuristics discussed below. In turn, both create an ability to see courses of action, reinforcing Lochead's (1985) assertion that superior problem solving is an active process. "Poor problem solvers," he maintains, "are less active because they do not believe there is anything for them to do" (p. 110).

Improving Judgement. Learning judgement and the role of experience in learning judgement is quite uncertain in the minds of the students. Most students were uncertain that judgement could be learned if one had no inherent ability to make judgements. They were, however, uniformly of the opinion that, at the least, judgement could be improved through learning and practice. The importance of knowing and understanding the values one holds, the moral positions one is prepared to take, and how they influence judgement also seemed important to many of the students. How a person learns to make judgements was also was discussed in chapter 6, and once again the role of experience providing a background for any judgements a principal had to make was apparent in student writing and comments.

Metacognition. Perhaps the most important augmentation to student learning to be suggested as a result of observing and talking with students who participated in this project would be to help them with problem solving, with thinking about their experiences, and how their development of a habit of reflection in action might be inculcated. In their compilation and overview of approaches to problem-solving, Polson and Jeffries (1985) observed that research in the past decade has shown:

> metacognitive knowledge... plays an important role in problem solving success. It has been suggested that the importance of this kind of knowledge be communicated to students to enable them more effectively to monitor their learning and problem-solving behaviour. (p. 424)

While the notions of reflective practice and reflective journalling, consideration of the Lewinian and Kolb models of experiential learning, and the self-assessment checklist are all valuable to students, it is believed they could be augmented by providing students with information about metacognition in the context of administrative problem solving.

Metacognition is often described in ways similar to that of Glaser (1991) who referred to important background skills involved in thinking and learning as "self regulation, the second order knowledge that enables individuals to reflect upon and control their own activities" (p. 133). These skills play an important part in learning and problem-solving. In considering the use of metacognitive strategies for solving ill-structured problems and for the exercise of judgment, Brown (1980) discusses four aspects of metacognition which are seen to be very relevant for administrators and closely connected to descriptions of expert problem solving: knowing what you know; knowing when you know; knowing what you need to know; and knowing the utility of active intervention. For example, a number of the simulation students who lacked confidence and regularly, if not constantly, questioned themselves, might benefit from thinking through an exercise which would help them to consciously recall that they have certain knowledge, and then recall the dimensions of that knowledge. With this self-knowledge a student could then construct an idea of what they needed to know and plan a course of action. It is not suggested that students would be instantly successful through the application of such mental exercises, but using them along with a growing knowledge base would seem likely to lead to improved professional work. It is suggested that a brief overview and description of these aspects of metacognition be incorporated into the course. Previous research suggests that this may further students' efforts to use approaches like the Lewinian model in seeking to habituate reflection in practice. Students would hopefully be able to use the four listed aspects of metacognition in the process of thinking about their actions and plans as school administrators, enhancing their awareness of what they were learning and helping them both to incorporate it into their schema structures, and giving them a set of heuristics they can use in their chaotic work worlds.

What gets in the way of learning. Other than the psychological baggage which students bring with them to the course, there are two items which should be mentioned as interfering with learning for some of the students. The first of these is the comfort that students felt with the computer interface and tools, and the level of familiarity they developed in using them. A significant number of students described elements which they did not grasp with regard to the computer interface, computer tools, and procedures for dealing with problem items. While students generally reported the interface easy to understand and deal with, the contrary reports suggest that the orientation to the work station is too hurried, and the practice work session activity too brief. This concern for brevity of the orientation is also supported by the lack of consistency in those details about the computer interface and tools which students did not remember after the orientation. The major exception here being notepad feature which few students seemed to have noticed or heard described. There was also a significant number of students who suggested that practice on two or three more items might be useful. Again, given the time constraints in the course, finding the necessary time will be difficult. It may be that one partial solution here would be the development of a print or computer based orientation to the work station which students could review, if they cared to, after the initial introductory session.

The second item which interferes with student learning is simply time. Several students and one instructor commented on the amount of their time the simulation course required. Study of the Rutherford and Pembina administrative materials, reading and journalling all combined to leave a feeling with a number of the students that the course required a substantial amount of time, more than in most other courses students are taking. Course instructors share this perception. Observations undertaken in the course of this research would also support it. Many significant work session items do not become a part of the debriefing discussions, and those that are may be cut short. Discussions of readings and tutorial activities also are constrained by the pressure of time. While this interferes with the learning, it also lends a dynamic sense to the course and while students don't feel they have adequate time for many of the items, they are never bored. The course developers have discussed this aspect of the course from time to time, but on each occasion it has seemed more desirable to leave a successful design in place rather than tinker with it.

Other suggested improvements. Students also suggested other aspects of the course which they would like to see expanded. One student suggested there should be more role playing and two others suggested there should be more use of peer debriefing. While there is no doubt that additional role plays could be designed which would be useful for students, it is difficult for this analyst to understand how an expanded role play component would be worth the trade off of other course activities which would be necessary.

Suggestions for additional peer debriefing offer a similar challenge. Given how vitally important students report the debriefing seminars are to their learning in the course, largely because of the opportunities afforded in the seminars to hear a wide variety of points of view, it would be a difficult decision to give up some of the seminar time for additional peer debriefings. The benefits in additional peer debriefings, of course, are the opportunity they afford for students to deal with more items and issues than would be possible in the seminar, particularly ones which are important to them, and the opportunity for students who do not feel comfortable speaking out in class to be involved in lower risk discussions. In other circumstances an acceptable alternative might be to form the peer discussion dyads early in the course and then to promote meetings outside of class time to pursue a broader range of items and issues. However, given the significant time commitment already required in this course, and student sensitivity to their time commitment, this does not seem to be a good solution. It would seem that the best course of action might be to reluctantly accept that current practice is the most effective learning approach achievable in a single term course, and that a change would actually have a negative impact on the development of expertise in the students.

How Well Does the Computer-Based Interactive Video Simulation Work?

Another of the research questions being investigated in this study was:

> *How well does the current design for the simulation materials, with its various electronic sources of information, assist students to establish a useful ongoing link between knowledge obtained through academic preparation and knowledge obtained through the problems they face in professional practice? To what extent does this environment assist in developing their understanding of the administrative role?*

The course structure, as it has evolved over the past decade, seems effective in the eyes of both students and instructors, given the time constraints under which it is necessary to work. The ways in which it creates useful, ongoing links between academic knowledge and various aspects of professional practice have been discussed in the preceding chapters and the preceding sections of this chapter, as has the way in which the experiential learning in this course assists students in developing an understanding of the administrative role. As we have seen, most students are convinced that the simulation approach to a course helps them integrate their theoretical and academic knowledge with their practical experience gained both through the simulations and through their ongoing work as educators. The willingness of students to accept simulated experience as worthwhile work experience has been discussed at length in chapter five, but it may be useful to remind ourselves of the willingness students had to accept this form of experience. Gary expressed it very directly:

> I liken it to student-teaching where you take a lot of theory but the real learning comes during your student-teaching. This experiential learning proves to be very valuable and I hope experiential learning on the principalship does as well. (Gary, Journal) (emphasis in the original)

In considering the research questions in this section, however, one might also ask: Given the student reports of the preponderance of the learning which took place in the seminars and through reflective journalling, would not the learning in this course be substantially the same without the simulation work sessions? The great importance of debriefing seminars and other reflective activities, like journalling, in learning from experience, both real and vicarious, is also confirmed in the literature, as we have seen (Boud, Keough & Walker, 1985; Ellington, 1987; Lederman, 1984; Romiszowski and Grabowski, 1989). In my opinion this suggestion must be discarded immediately as it eliminates the power of shared experience from the learning design.

However, it has also been suggested that the computer-video work sessions could be replaced with paper outlines of the incidents, or with overview case studies. The response to such a suggestion, based on the observations, analysis of student journals and computer work, the interviews done for this study, plus the previous experience of the researcher with case studies and other simulations, would be that the course experience would not be the same. Indeed, members of the project team have developed and experimented with a more portable paper form of the simulation (Maynes, McIntosh, & Mappin, 1995) which makes use of many of the video orientation materials and the Rutherford School district information files. While this modified form has been said to work reasonably well for getting at some issues, it lacks the compulsion of the full simulations with their involving video, interruptive crises and telephone calls. It is obvious from this study that students are drawn into a special learning experience in a full simulation with a rich situational environment, and they learn different things in a more motivated way than students who are learning from a case study. The high quality contextual information provides a circumstance where students cannot simply invent character traits or political alliances to justify what they have done, and in that sense the work in a full simulation becomes more like an administrative activity, one of analysis and judgement. At the same time, experience with the instructional use of case studies has shown that students will often undertake an act of creative imagining in which personality traits and social circumstances are constructed to justify the students' proposed solutions.

One might postulate a range of effectiveness in methods such as these, then, with effectiveness being dependent on two variables -- the richness of the situational factors, and the fidelity of the simulation itself. A case study would normally be far less real and involving than one of the simulation items, and it would happen in a context bereft of most of the rich situation descriptions which have been developed for Rutherford and Pembina. Starting from the sparse situational descriptions in text typical of a case study and the cool interaction of reading and discussion, one could add enhancing contextual details and amplify the information provided for the problem items themselves. The ways in which the students interacted with the materials could be altered to enhance the fidelity, until the richness of a full simulation is reached. The resulting simulation would be as full as, or likely, advanced beyond the Pembina school simulation being studied here.

It is this belief that a fully interactive, contextually rich simulation is a highly useful alternative approach to learning that leads to a consideration of how such a simulation may be evolved.

Enhancing Simulation Activities

The last research question posed for this study was:

> *Using the experiences with the Project Decide simulation materials and current relevant theory and scholarly writing, what advanced design might be crafted for a simulation/information environment for the training/education of administrators?*

This question was not posed in the abstract. Given the success the elementary school simulation course was enjoying, the development team members were very interested in extending the work to a second simulation on the junior high school. In fact, while this study was underway work had begun in interviewing junior high school principals and other educational administrators to accumulate an initial set of problems for such a simulation. This junior high school simulation was also to be set in Rutherford and the school was to be named Aberhart Junior High School.

It should be remembered that the development of the Project Decide simulations has gone on for a decade and that it is an evolutionary process. For this reason many small adaptations and improvements to the elementary school simulation have been undertaken as they were identified during the use of the interactive computer videodisc version of the course. For example, when the development team became aware of the need for more extensive learner control of the video in the simulations, controls were programmed into the video presentations. Similarly, asterisks were introduced to the problem item choice lists on the computer screen early in the use of the current version. The asterisks were programmed to appear after an item was first viewed to give students an indication they had perused the item. The enhancements to the simulations to be discussed in this section are more substantial and involve changes to the simulation environment which will be presented as medium term and longer term improvements. The medium term improvements are quite feasible with available technology and could be implemented at the present time, but they should be undertaken as a major move to a new version which would have an impact on the design of the junior high school simulation and revisions to the Pembina Elementary School simulation. The longer term improvements involve technological improvements which are feasible, but which would require some experimentation and computer work stations with substantially more power.

There are four more general categories of improvements to the simulation which are recommended based on observations and student and instructor comments on the current version of the Pembina simulations.

1. There should be more use of video in the presentation of items and information. Student observations have underscored the fact that the video items, with the presentations and interruption by staff members and others which are contained within them, are perceived to be more true to the fashion in which incidents come to the principal during a real working day.

   Achieving this will require a higher percentage of video problem items, more 'memory flashes' in both text and video problem items, and the development of a new presentation technique. This new presentation technique, called the "walking tour," has been prompted not only by the suggestion for more video, but also by the suggestion for more investigative possibilities (see improvement 3) and a greater immediate knowledge of consequences (see improvement 4).

   The walking tour is an idea which promotes the value of principals being out among the teachers and students in their schools, not just solving problems from their offices. To realize this in the simulation environment a timed interrupt is used during each work session to present the student with a choice of taking a walk around the school during a break between class periods. If the student takes the opportunity, the camera proceeds on a walk through the school corridors. During each walk the principal comes in contact with a number of teachers, students, and members of the community. Occasionally, the individuals involved in these encounters impart a piece of good news or offer congratulations, but more frequently they will present the principal with a problem. While some of these problems are very serious, the are all tractable at the time of the encounter, that is, some action can be taken to resolve the issues presented. They are presented in a manner which could be described as an integrated series of interruptive crises, many with branching and investigative elements attached to them. All of these problems are considered work session items, and each requires a response record to be completed. Should the student decline the opportunity to take a walk around the school in order to get more time to work on the problems on the item list, one of the problems that would have been addressed during the walking tour will escalate into a very major crisis. This crisis is to be presented, again via timed interrupt, at a point five minutes before the simulation ends at a state of development in which the best possible scenario will be containment and the minimization of disaster; solution will not be possible.

2. The ease with which a student becomes and remains immersed in the simulation should be improved. Those areas where the system itself interferes with students' concentration and absorption in the simulation must be reduced. This improvement would be largely accomplished through selected improvements in the transparency and ease of use of the computer interface. There are four aspects of the current way students must operate, related to the design of the computer interface, which cause problems, according to observational data and student comments:

a. The list from which students choose the item they want to see next must be reconceptualized to provide a better indication of what the item is. The current list uses the name of the person forwarding the item and far too high a percentage of them are simply labelled 'MacDonald note', with no other information about what the item might be. Even after students have looked at them they have no easy way of distinguishing one from another. A new way of representing these items must be found, possibly by using a short descriptive phrase from the material itself.

b. The students have no way they can tag or sort items as they organize their work time. While some students will still choose to work on each item in the order in which it is presented, for reasons discussed in chapter five, many would prefer a method of sorting the material into several categories. With a move to an operating system using a graphical user interface, and with a 'drag and drop' capability, a method of allowing to students to choose an item and drag it into a space where it can be collected with items of like priority/importance has been derived.

c. The students have consistent problems when they are presented simultaneously with telephone calls and interrupt items. As discussed earlier, this results by chance. This must be resolved as some of the most important problems in a work session are be presented as an interrupt, and this problem will be exacerbated in any simulation which incorporates a "walking tour" as well as interrupts. It is suggested that the largest part of this problem may be solved by providing both a pause feature and a repeat feature for the video presentation portions of both the interruptive crises and the walking tour.

d. The choices which permit students to finish investigations in an interruptive crisis and other branching items and move to the response records have been confusing to some students in some cases. More obvious ways to finish work on these items must be incorporated into their design. This is easily done through additions to choice menus, and with clear indicators on the screen.

3. There should be more opportunities for students to gather information and investigate alternative courses of action in each item. Students have commented consistently, both during the research project and in other offerings of the course, that the simulation would be more realistic if they had the opportunity to do more investigation into different aspects of the problems they face, and to talk to more people who might have information they could use. In response to this, more of the items would have investigative options and 'memory flashes' added to them, and there would be more branching items, giving students the additional sources of information they see as useful. In addition, the walking tour described above (and the design for the items within it) owes a substantial amount to this

feedback.

4. There should be more ways that students can know the consequences of their actions in the simulation. Students also want to know what happens and what the quality of their response might be. The developers refer to this as a knowledge of consequences. It is achieved through means that simulation developers refer to as either natural or unnatural feedback (Alessi & Trollip, 1985). Natural feedback is when the consequences of an action are immediately, or within a short time period, discernible to the student through something that happens in the simulation environment. For example, this might be an immediate verbal response from a person presenting a problem, or the arrival of some other person in response to a request, or in the case of a declined walking tour, the presentation of a major new problem. The category of feedback referred to as unnatural involves someone telling you how you did, or what might happen or what did happen in similar circumstances. This type of feedback could come in the simulation, in a debriefing activity or in a written or video presentation which can be consulted. From these, students can undertake a comparison with their actions and draw their own conclusions about the effectiveness of what they did. Natural feedback is generally considered to be superior, but is more difficult to craft without imposing some values and some assumptions about the student into the scenarios.

To provide students with a greater knowledge of consequences through natural feedback the development of more items which have on-screen investigation or on-screen action possibilities, with several alternate courses of action available, would be desirable. The greater the number of action - reaction cycles such items could have, the better the student would see the consequences of any action, and the better the natural feedback condition would be.

The debriefing seminars and peer debriefing activities already provide as much knowledge of consequences (unnatural feedback) as possible given the available time. However, one idea which has been used in the past might be reconsidered and resurrected in this regard. In the early version of the simulation a set of 'expert commentaries' was provided in print form for students to review once the simulation was completed. These expert commentaries provided students with descriptions of how the practicing administrator involved had handled the original incidents. As the work session items are all based on actual events they provided students with another way of gaining information on consequences. The difficulty with the expert commentaries has always been that a certain number of students disregard the contextual factors and the slight adjustments made to the issue for the simulation, quickly reaching the conclusion that the expert commentary provided **the** right answer, which could unduly influence discussions in the debriefing seminars. As the course evolved, these explications of actual events tended to be downplayed, and then left completely unused by instructors for this reason. In the light of a desire for knowledge of consequences and research findings about how students grow into expert practitioners, it may be that the provision of 'expert commentaries' should be revisited, with appropriate caveats in place. Perhaps a delay in their availability until after the formal debriefings for a particular work session were complete might eliminate the disincentive for students to devise their own solutions to the problems.

The more specific categories of possible improvements which emerged from this research also may be sorted into four clusters: specific suggestions for the computer programming, for the video presentations, for the design of the response record, and for the staff profiles.

Computer improvements. The following improvements in the computer system are suggested as a result of this research:

1. An improved operating system should be adopted which makes use of a graphical user interface in a higher screen resolution than the current EGA resolution. This is seen as an important improvement. Such an interface would permit the development of more useable windows with scroll bars and advantageous 'drag and drop' features. This would help to reduce student confusion with a number of long lists and overlapping windows in the current design. This would help with the general organization of the material and with several of the improvements discussed in the preceding section.
2. An on-line calendaring feature should be included to provide better date and day of the week information which will help student principals to fit

themselves temporally into the simulation context. The selection of a calendar which also has space for the inclusion of information would permit the inclusion of scheduled meetings for the principal and events in the school and district at the time of the simulation. This feature would also help student principals orient themselves.

3. An improvement in the presentation of school budget information to students is also seen as a necessary improvement. It is suggested that a computer spreadsheet program such as *Excel*, linked to the simulation interface, should be explored for this purpose. A computer spreadsheet should not only help with the organization and presentation of the budget information, but it would also permit students to modify the budget in accordance with their vision for the school and to save it for reference in future work sessions.

4. The Walkabout map which permits students to see different parts of the physical plant of the school would be more useful to students and would also enrich the presentation of the context of the school if the rooms were identified by the names of the home room teachers rather than room numbers as is done now.

Video. There are also two aspects of the video production for the simulations which should be improved based on student comments and research observations:

1. The present method of presenting text items as still frame video has resulted in some blurring and fuzziness of the image presented to students. The clarity of

these text items needs to be improved, either by replacing the video images with high resolution computer graphics, or by a greatly improved video approach.

2. Although they saved necessary space on the videodiscs produced for the Pembina simulation, the cartoon sequences in the staff profiles bothered some students and confused some others. With the elimination of the need to include the staff profiles within the work sessions, as described below, videodisc space will not be such an issue and the cartoon sequences could possibly be replaced by motion video sequences, which would also improve the overall fidelity of the simulation environment.

References. As was described in chapter five, the provision and use of the reference materials in the simulation has not worked out as well as had been anticipated. The research undertaken in this project has led to the conclusion that the references are an important part of the simulation environment, as a symbol and an enrichment of the context, if for no other reason. Student comments suggest that the references might get more use if two improvements were made:

1. The text search and retrieval tool provided for searching the references needs to be redesigned and made easier to use.
2. The Table of Contents for each legislative act needs to be rethought and made more useful. The current approach which provides only the chapter number is virtually useless to students and another approach using descriptive phrases needs to be devised to make it possible for students to tell which chapter has the information they seek.

There were also two student comments which would suggest the desirability of including the Alberta Teachers' Association handbook among the available reference materials. Consequently:

3. A renewed effort should be made to have the ATA agree to permit the inclusion of the ATA Handbook, including the Code of Ethics, in the electronic references available to students.

Response Record. Although the impression conveyed by staff and students was that the response record was very useable, one student made a suggestion which warrants serious consideration by the course designers. The absence of staff meetings from Pembina activities has been raised by students from time to time during various offerings of the course. The course designers have discussed this possibility from time to time, but have never been able to imagine how it might be done, possibly because they were trying to present, in video form, a staff meeting which revealed useful aspects of staff interpersonal dynamics. One student, Werner, suggested that the response record be modified to include a staff meeting agenda which student principals would create and modify as the work session progressed. This could be accomplished by creating a file which could be accessed in all the items of the work session. Such an item would provide an interesting adjunct to the information available in the debriefing seminars.

Staff Profiles. One of the resources which students consistently saw as a simulation strength were the staff profiles. However, as was pointed out in chapter five, students worked with the staff profiles in preparation for the simulation work sessions, not during them. With this in mind it is suggested that staff profiles be eliminated from the work session structure and computer interface, remaining a resource to be studied as an orientation material available, as they are now, after the first work session.

Among the recommendations from students were two which could only be viewed as longer term possibilities. They are reported here not so much because it is thought that they are feasible future developments, but more to illustrate how simulation possibilities captured student imaginations. The first improvement was the implementation of speech recognition and transcription technology so that students could talk to the system and to the various members of their virtual community as they would in real life. Although a good deal of additional work would have to be done, such an enhancement is within the realm of possibility, given the speech recognition technology which is already available.

The second longer term improvement was the provision of much larger monitors to provide a more involving environment. Perhaps the most excited and involving description of how this should work was provided by Larry:

> I would look at a larger carrel, like some of the new office desks that have the hoods, or something, so you could have a life size image there -- sound surround where you could actually hear them without the cumbersome attachment.

Perhaps this is a suitably futuristic note on which to end this chapter. The technological possibilities for enhanced simulation designs such as this will definitely expand. The learning potential has been demonstrated, but there are still a number of concerns with regard to the costs and time involved in development and many research questions which remain to be explored.

Chapter 8

Summary and Implications for Further Research

Good Tidings and Persistent Concerns

For this dissertation the researcher set out to use a case study approach to describe and interpret the development, implementation, and evaluation methods used in an innovative learning system for the preparation of school administrators. The information obtained and the interpretations which have been written have illuminated aspects of what graduate students are learning in the course and how activities in the simulation course might contribute to their preparation to become skilled, reflective principals, who are expert problem solvers capable of making good judgments. The research also can be seen to confirm the effectiveness of longer term, iterative instructional development processes. Over the decade of work on this project a theoretical base has been developed and used to evolve a pedagogical approach which is a very effective component of professional preparation. The pedagogical approach has been described by both instructors and students as an effective one, as the following testimonials attest:

> I wouldn't mind putting a plug in for the course. I think the course is a particularly valuable one. This is the first course I've run into like this -- it is kind of in a class by itself. I think it is particularly valuable -- like I say, in practice you never really get to have any real meaningful comments on your actions or the elements that went into your decision because nobody feels involved in solving your problem, whereas this one... (Gene, Interview)

> I really feel as though I have benefited from the simulations. It's hard to say exactly how I have grown because it seems to have happened too quickly. I feel much more confident in my abilities now. In a way the class has helped to provide confirmation that my career aspirations are heading in the right direction. It has been reassuring to hear experienced

> administrators describe how they would handle a particular situation, especially when their actions were similar to the choices that I made. By the same token, it has been helpful to see how particular situations were dealt with that I either didn't know how to handle, or perhaps handled ineffectually. Rereading back through this logbook I'm pleased with the progress that I have made. I have proven myself to myself as I wanted to at the beginning. (Phillip, Journal)

> Trying to step back from what we've done and assess it in some kind of more general perspective, we have put a great deal of work into developing this course.... I venture to say that there isn't a course taught at the University of Alberta in which more time and effort by more people have gone into the creation of the materials, and I think that we have created a very, very positive learning situation for our students.... (Instructor One, Journal)

As a result of this study a number of potential improvements in course activities and in the simulation itself have been described. A strong case can clearly be made for the utility of simulation methods in supporting experiential learning for students in the educational administration program, as well.

If any questions persist with regard to the development and use of simulations for professional preparation, they are of a type usually associated with major instructional development undertakings of this sort: Is the effort and the money that is required to design, produce, implement, and operate a learning experience which is distinctive and gets at important learning which cannot be approached well through other methods worth the investment?

One of the instructors expressed these doubts:

> I guess the lingering question is: In cost-benefit terms, have the benefits that we have achieved and will achieve, do they justify the tremendous effort that we've put into them?.... I think we've had good support to this time, from our seniors, from our masters, in terms of the Department Chairs and Deans. They've been very encouraging and probably, without

> that encouragement at key moments in the past, we might not have been able to continue. I certainly feel that what we have done is worth doing, but I sometime have doubts about whether our colleagues would say the same. I don't see other people stepping forward and developing learning systems, whether they are like ours or use another technique. (Instructor One, Interview)

In an atmosphere of ongoing public spending reductions, such as is happening at this time, what ongoing value will be placed on this experimental pedagogical approach? It is difficult to say. Certainly very large amounts of money continue to be spent by the institution to put new technological systems for learning in place in advance of any sound pedagogical approach, or instructional design, being described for them. The Project Decide pedagogy is sound and thoroughly grounded both in theory and demonstrated effectiveness. In the end it will be a question of values about pursuing this kind of instruction while issues involving costs are addressed. As Instructor One put it:

> It ultimately depends on what value influential people place in having this as an alternative learning opportunity. And to this point, influential people, namely Deans and Department Chairs, have said, "Yes, this is a really good thing to do," and they regularly trot it out when there are guests to be shown about the Faculty. I think the leaders in this Faculty have seen it as being a very positive innovation, but it's been a very positive innovation which has required, I think, disproportionate levels of effort to achieve. (Instructor One, Interview)

Whether it is a disproportionate level of effort, or the cost of effective learning on a level we have previously ignored, but which is so important we may be willing to accept the added costs, remains to be seen. Also to be explored is how such materials, explicitly context dependent as they are, might be produced for use in a sufficient number of jurisdictions to justify the cost. The UCEA simulation project (UCEA Review, 1993) is attempting a large scale development of a simulation environment for the preparation of educational administrators with a significant number of institutions participating, and a larger scale project optimized for partners across a country is one possible approach. Another approach, particularly relevant for simulations like the Project Decide materials, would be to try producing smaller modules of information, specific to particular legislative, jurisdictional, and cultural contexts, which could be interchangeably attached to the simulation materials to make them an effective and exciting pedagogical option in the regions represented by the contextual information modules.

Implications for Future Research

This case study research is providing support for the development of a junior high school simulation course incorporating an advanced design for the simulations themselves, as discussed in chapter 7. The course design which will be used in this instance will be very like the one used for the Pembina Elementary School simulation course, as this study strongly suggests that the overall course design is excellent, although a few minor changes might result in even better student learning. As this new simulation course is produced and implemented, further research should be conducted which evaluates the new elements of the course and expands upon the knowledge which has emerged from this study and other Project Decide work. Some of this additional research could be fruitfully directed into:

- augmenting our knowledge of expert problem solving by principals,
- illuminating aspects of what judgment is and how we might improve the ability of individuals to make judgements,
- undertaking further research on the effectiveness of the advanced simulation

design, any impact it may have on learning, and on the course in which they are embedded,

- in undertaking a study of the longer term learning impact that the simulation course may have had on practising administrators.

Possible problem-solving research. This research study raises a number of interesting questions for further studies which would explore the principal in the context of the psychological research which has been done on expert problem solving: How could the expert principal problem solver be described? What could be said to characterize the deep understandings and highly abstract conceptual knowledge which they possess? Do principals thought to be experts truly undertake problem solving strategies which are different from novices in the course, and to what extent do they match the descriptions of expert and novice problem solving presented in the literature? Do the novices in the course attempt to use rules to govern their decision making (from decision making models or somewhere else), or do they use the common sense problem solving heuristics of the group often referred to in the literature as "just plain folks"? What specific knowledge, categories, or conceptual abstractions do experts use that novices don't?

The knowledge from such research would not only prove useful in the design and development of simulations for the development of principals and other educational leaders, but would also advance our understanding of the work of principals and how it is and might be undertaken.

Future research into making judgments. One of the most tantalizing questions which emerged from this study was the question of whether or not judgment can be learned. How might we know this and how might we describe such knowledge in a scholarly sense that has some resonance with others? Further, if it were postulated that at least a certain portion of an ability to make sound judgements was innate, could an individual's ability to make what peers might consider good judgements be improved through training, education, or practice? What activities might a learner undertake to improve their judgement? Again, such research would not only advance our work on simulations, but would also advance our understanding of the principalship, and perhaps create some knowledge which should influence the selection of principals.

Researching the improved simulation and simulation course design. A number of new features for the simulation and for the simulation course have been advanced as a result of this research. When the advanced design for the junior high school simulation is completed, incorporating some of the recommendations from this research, an additional research cycle should be undertaken to gauge the reaction of students to the new simulation and the impact that has had on their learning both to be educational leaders, and to become reflective practitioners.

Studying longer term learning. Perhaps the most interesting further research would be to undertake a study of the longer term learning effects of the simulation course with students who have taken the course. In fact, the groups which participated in the current study could provide a good target group for such a study with the data from the current study providing the basis for some comparisons, where possible. If the study were undertaken in 1996, one group would be five years on from their study, the other four. Some of the more interesting questions which might be answered in such a study are: What did they take from the course which influences their professional practice now, some years later? Are they practicing reflection in action? How do they approach problem solving? Have they persisted with creating a vision for their school? To what extent is the cultural context of the community and the school a factor in their work as school administrators?

The findings of such longer term studies might provide part of the justification for the time and expense involved in developing this sort of learning environment and pedagogical approach. If longer term influence in the creation of highly competent professionals were to emerge in the findings from such a research undertaking, what value could be assigned to the learning experience which enabled them? Would that value be large enough to justify a more expensive pedagogy, such as simulations? On the other hand, if there were no obvious long term influences, what justification could there be for developing other similar pedagogical approaches?

Conclusion

The development work and research being conducted in Project Decide is, as far as can be determined, unique in the world with regard to the type of open ended simulation and its application to the preparation of educational administrators. This study has provided additional confirmation that the design and operation of both the simulation and the simulation course are very effective. Scholarly work which will enhance the use and understanding of simulation methods and the student learning related to them should be continued. This pedagogical approach should not only continue to benefit learners in the graduate program in educational administration at the University of Alberta, but these open-ended simulation methods, with all of the learning benefits described in this dissertation built in to them, might well have application in the preparation of other public sector and non-governmental organization managers.

Footnotes

1. The choice to have Stacey Metzger, the student principal working through the simulation, overhear staff interactions to supply him/her with needed information was a design/production decision taking with a view to having the simulation as 'natural' as possible. While there is an ethical question related to this decisions about whether a school leader should pause to listen to private conversations, it was decided that this method of presenting information was preferable to other alternatives. For example, a staff member could have come to see Stacey and given the information directly, but that seemed very artificial, created an unwanted character dimension to those characters bringing the information, and created ethical problems about professional conduct which were more serious than simply overhearing a conversation. Providing the information through some 'deus ex machina' mechanism, be it an uninvolved video coach or some text information system, also seemed highly detrimental to the simulation design, so detrimental that we decided to use the encounter approach seen in the video segments.

   It should be emphasized that the design team does not advocate school personnel gossiping or eavesdropping on each other but, that said, in our experience information which should be personal and confidential does get around within most school cultures.

REFERENCES

Achilles, C. (1988). Unlocking some mysteries of administration and administrator preparation. In D. Griffiths, R. Stout, & P. Forsyth (Eds.), *Leaders for America's schools.* Berkeley, CA: McCutchan Publishing Corporation.

Alessi, S. (1988). Fidelity in the design of instructional simulations. *Journal of Computer-Based Instruction,* 15(2), 40-47.

Alessi, S., & Trollip, S. (1985). *Computer based instruction: Methods and development.* Englewood Cliffs, NJ: Prentice-Hall.

Beckwith, D. (1988). The future of educational technology. *Canadian Journal of Educational Communications*, 17 (1), 3-20.

Benner, P. (1984). *From novice to expert.* Menlo Park, CA: Addison-Wesley Publishing Company.

Berg, B. (1989). *Qualitative research methods for the social sciences.* Boston, MA: Allyn & Bacon.

Bogdan, R., & Biklen, S. (1982). *Qualitative research for education.* Boston, MA: Allyn & Bacon.

Boud, D., Keough, R., & Walker, D. (1985). *Reflection: Turning experience into learning.* London, UK: Kogan Page.

Bransford, J., & Stein, B. (1984). *The ideal problem solver.* New York: W. H. Freeman.

Bransford, J., Vye, N., Adams, L., & Perfetto, G. (1989). Learning skills and the acquisition of knowledge. In A. Lesgold & R. Glaser (Eds.), *Foundations for a psychology of education* (pp. 199-249). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bruner, J. (1990). *Acts of Meaning.* Cambridge, MA: Harvard University Press.

Bruner, J. (1971). *Towards a theory of instruction.* Cambridge, MA: The Belknapp Press.

Brown, A. (1980). Metacognitive development and reading. In R. Spiro, B. Bruce, & W. Brewer (Eds.), *Theoretical issues in reading comprehension* (pp. 453-481). Hillsdale, NJ: Lawrence Erlbaum Associates.

Brown, J. S. (1983). Learn-by-doing revisited for electronic learning environments. In M. A. White (Ed.) *The Future of Electronic Learning*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher,* 18(1), 32-43.

Brown, J. S., & Duguid, P. (1993). Stolen knowledge. *Educational Technology*. 33(3), 10-15.

Buckley, J., & Marowitz, M. (1989). Integrating ARCS motivational theory into interactive media design. Paper presented at the AECT national conference, February, 1989.

Burkman, E. (1987). Factors affecting utilization. In R. Gagné, Ed., *Instructional Technology Foundations*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Bush, V. (1945). As we may think. Reprinted in Lambert, S. & Ropiequet, S. (Eds.), (1986), *CD ROM: The new papyrus*. Redmond, WA: Microsoft Press.

Cambre, M. (1981). Historical overview of formative evaluation of instructional media products. *Educational Communications and Technology Journal*. 29 (1), 3-25.

Chase, W. & Simon, H. (1973). The mind's eye in chess. In W. Chase (Ed.), *Visual information processing* (pp. 215-281). New York: Academic Press.

Chi, M., Glaser, R., & Farr, M. (1988). *The nature of expertise*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Choi, J., & Hannafin, M. (1995). Situated cognition and learning environments: Roles, structures, and implications for design. *Educational technology reseacher and development*. 43(2), 53-70.

Clark, R. (1983). Reconsidering research on learning from media. *Review of Educational Research,* 53 (4), 445-460.

Cognition and Technology Group at Vanderbilt. (1990). Anchored instruction and its relationship to situated cognition. *Educational Researcher*, 19 (6), 2-10.

Cole, P. (1992). Constructivism revisited: A search for common ground. *Educational Technology*, 32 (2), 27-34.

Covington, M. (1985). Strategic thinking and the fear of failure. In J. Segal, S. Chipman, & R. Glaser (Eds.), *Thinking and learning skills: Volume 1, Relating instruction to research* (pp. 389-416). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cunningham, J. B. (1984). Assumptions underlying the use of different types of simulations. *Simulation & Games*, 15 (2), 218-234.

de Bono, E. (1985). The CoRT thinking program. In J. Segal, S. Chipman, & R. Glaser (Eds.), *Thinking and learning skills: Volume 1, Relating instruction to research* (pp. 363-388). Hillsdale, NJ: Lawrence Erlbaum Associates.

De Groot, A. (1965). Thought and choice in chess. The Hague: Mouton.

DeBloois, M. (1988). *Use and effectiveness of videodisc training.* Falls Church, VA: Future Systems Inc.

Diamond, R. (1975). *Instructional development for individualized learning in higher education.* Englewood Cliffs, NJ: Educational Technology Publications.

Dittrich, J. (1977). Realism in business games: A three game comparison. *Simulation and Games,* 8 (2), 201-211.

Dreyfus, H. L. (1972). *What computers can't do.* New York, NY: Harper & Row.

Dreyfus, S. & Dreyfus, H. (1980). A five stage model of the mental activities involved in directed skill acquisition. Unpublished reported supported by the Air Fore Office of Scientific Research (AFSC), USAF (Contract F49620-79-C-0063) University of California at Berkeley.

Duffy, T. & Jonassen, D. (1991). Constructivisim: New implications for instructional technology? *Educational Technology,* 31(5), 7-12.

Ellington, H. (1987). *How games and simulations can be used in tertiary education, teaching and learning in higher education.* Aberdeen, Scotland: Scottish Central Institutions Committee for Educational Development. (ERIC Document Reproduction Service No. ED 289 491).

Foster, W. (1986). *Paradigms and promises.* Buffalo, NY: Prometheus Books.

Feuerstein, R., Jensen, M., Hoffman, M., & Rand, Y. (1985). Instrumental Enrichment, an intervention program for structural cognitive modifiability: Theory and Practice. In J. Segal, S. Chipman, & R. Glaser (Eds.), *Thinking* *and learning skills: Volume 1, Relating instruction to research* (pp. 43-82). Hillsdale, NJ: Lawrence Erlbaum Associates.

Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L. Resnick (Ed.), *The nature of intelligence*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Fullan, M. (1982). *The meaning of educational change.* Toronto, ON: The OISE Press.

Fullan, M., & Hargreaves, A. (1991). *What's worth fighting for? Working together for your school.* Toronto, ON: Ontario Public School Teacher's Federation.

Garman, N., Piantanida, M., Goodwin, S., Leukhardt, J., Holland, P., Minick, B., & Andrusko, M. (1986, May). The conceptual dissertation: Commentaries by practitioners as inquirers. Paper presented at the annual colloquium of the Councial of Graduate Students, Pittsburgh, PA.

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory.* Chicago: Aldine.

Glaser, R. (1991). The maturing relationship between the science of learning and cognition and educational practice. *Learning and Instruction* (pp. 129-144). London, UK: Pergamon Press.

Griffiths, D., Stout, R., & Forsyth, P. (eds.) (1988). *Leaders for America's schools.* Berkely, CA: McCutchan Publishing Corporation.

Griffiths, D., Stout, R., & Forsyth, P. (1988). The preparation of educational administrators. In D. Griffiths, R. Stout, & P. Forsyth (eds.) *Leaders for America's schools*. (pp.284 -304).

Guba, E. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communications and Technology Journal,* 29 (2), 75-91.

Guba, E. & Lincoln, Y. (1981). *Effective evaluation: Improving the usefulness of evaluation results through responsive and naturalistic approaches*. San Francisco: Jossey-Bass.

Guba, E. & Lincoln, Y. (1982). Epistemological and methodological bases of naturalistic inquiry. *Educational Communications and Technology Journal,* 30 (4), 233-252.

Hannafin, M. J. (1985). Empirical issues in the study of computer assisted interactive video. *Educational Communication and Technology Journal,* 33 (4), 235-248.

Hannafin, M. & Peck, K. (1988). *The design, development, and evaluation of instructional software.* New York, NY: Macmillan.

Harper, G. (1980). A simulation technique to teach a graduate course in early childhood development. *Teaching of Psychology,* 7 (4), 218-221.

Heines, J. (1984). *Screen design strategies for computer-assisted instruction.* Bedford, MA: Digital Press.

Henderson, J. (1989). Regimental surgeon: Interactive media for surrogate on the job training. In the proceedings of the Eleventh Annual Conference on Interactive Videodisc in Education and Training. (pp. 53-55). Warrenton, VA: Society for Applied Learning Technology.

Hoban, C. (1938). Experimental research in instructional films. In E. Dale, F. W. Dunn, C. F. Hoban, & E. Schneider (Eds.), *Motion pictures in education.* New York, NY: Wilson.

Hooper, S. & Hannafin, M. (1986). Variables affecting the legibility of computer generated text. *Journal of Instructional Development,* 9 (4), 22-28.

Husen, T. (1988). Research paradigms in education. *Interchange,* 19 (1), 2-13.

Jonassen, D. (1982). *The technology of text.* Englewood Cliffs, NJ: Educational Technology Publications.

Jonassen, D. (1991). Objectivism versus constructivism: Do we need a new philosophical paradigm? *Educational Technology Research and Development,* 39 (3), 5-14.

Kearsley, G. & Halley, R. (1985). *Designing interactive software.* La Jolla, CA: Park Row Press.

Kintsch, W., & van Dijk, T. A. (1978). Toward a model of text comprehension and production. *Pyschological Review,* 85(5), 363-394.

Kolb, D. (1984). *Experiential learning.* Englewood Cliffs, NJ: Prentice Hall.

Kotovsky, K. & Fallside, D. (1989). Representation and transfer in problem solving. In D. Klahr & K. Kotovsky, (Eds.), *Complex information processing: The impact of Herbert Simon.* (pp. 69-108). Hillsdale, NJ: Lawrence Erlbaum Associates.

Kozma, R. (1985). A grounded theory of instructional innovation in higher education. *Journal of Higher Education,* 56 (3), 300-319.

Larkin, J. (1989). What kind of knowledge transfers? In L. Resnick (Ed.), *Knowing, learning , and instruction.* (pp. 283-306). Hillsdale, NJ: Lawrence Erlbaum Associates.

Larkin, J. (1985). Understanding, problem representations, and skill in physics. In J. Segal, S. Chipman, & R. Glaser (Eds.), *Thinking and learning skills: (Vol. 2): Research and open questions* (pp. 141-160). Hillsdale, NJ: Lawrence Erlbaum Associates.

Lave, J. (1991). Socially shared cognition. In L. Resnick, J. Levine, and S. Teasley (Eds.), *Perspectives on socially shared cognition.* Washington, DC: American Psychological Association.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge: Cambridge University Press.

LeBow, D., & Wager, W. (1994). Authentic activity as a model for appropriate learning activity: Implications for emerging instructional technologies. A paper presented to the national conference of the Association for Educational Communications and Technology, Nashville, TN.

LeCompte, M. D. & Goertz, J. P. (1982). Problems of reliability and validity in ethnographic research. *Review of Educational Research,* 52 (1), 31-60.

Lederman, L. (1984). Debriefing: A critical reexamination of the postexperience analytic process with implications for its effective use. *Simulation and Games,* 15 (4), 415-431.

LeVan, H. & Carley, C. (1984). Experiential learning: Examination of factors affecting use and outcomes. *Simulation and Games,* 15 (2), 235-246.

Lindberg, M. (1980). The role of structures in the ontogeny of learning. *Journal of Experimental Child Psychology*, 30, 401-410.

Lindblom, C. E., & Cohen, D. K. (1979). *Usable knowledge: Social science and social problem solving.* New Haven, CT: Yale University Press.

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry.* Beverly Hills, CA: Sage.

Lipman, M. (1985). Thinking skills fostered by philosophy for children. In J. Segal, S. Chipman, & R. Glaser (Eds.), *Thinking and learning skills: Volume 1, Relating instruction to research* (pp. 83-108). Hillsdale, NJ: Lawrence Erlbaum Associates.

Lochead, J. (1985). Teaching analytic reasoning skills through pair problem solving. In J. Segal, S. Chipman, & R. Glaser (Eds.), *Thinking and learning skills: Volume 1, Relating instruction to research* (pp. 109-132). Hillsdale, NJ: Lawrence Erlbaum Associates.

Manasse, A. L. (1985). Improving conditions for principal effectiveness: Policy implications of research. *The Elementary School Journal*, 85 (3), 439-463.

Mappin, D. A., McIntosh, R. G., & Maynes, W. G. (1989). Fidelity as an issue in the design of an interactive video simulation of the principalship. In the proceedings of the 1989 National Conference of the Association for Media and Technology in Education in Canada.

Mappin, D. A., & Campbell-Bonar, K. (1990). Using models of planned change as a design factor in developing videodisc materials for use by teacher educators. A paper presented to the national conference of the Association For Educational Communications and Technology, Anaheim, CA.

Mayer, R. E.. (1983). *Thinking, problem solving, cognition.* San Francisco: W. H. Freeman.

Maynes, W., McIntosh, R. G., & Mappin, D. A. (1995). Simulations of the school principalship. A paper presented to annual national conference of the Canadian Association for the Study of Educational Administration, Montreal, PQ.

Maynes, W., McIntosh, R. G, & Mappin, D. A. (1992). Experiential learning through computer-based simulations. *Alberta Journal of Educational Research.* Volume 38 (4), 269-284.

McIntosh, R. G., Mappin, D. A., Maynes, W., & Ward, K. (1991, October). Development of a computer-based simulation of the school principalship: from Pembina to Aberhart. In E. Miklos & E. Ratsoy (Eds.), *Educational Leadership: Challenge and Change. Proceedings of the 35th Anniversary Conference of the Department of Educational Administration,* Edmonton, AB.

McIntosh, R. G., Maynes, W., & Mappin, D. A. (1989, October). *Preparing educational* *leaders for the 1990's*. A paper presented to the 21st annual meeting of the Western Canada Educational Administrators, Edmonton, AB.

McIntosh, R. G., Maynes, W. G., and Mappin, D. A. (1988). Preparation for professional practise. *The Canadian Administrator,* 28 (7), 1-5.

McLeod, R. (n.d.). *"Strathlethan" -- an in-house videodisc production.* [Brochure]. Aberdeen, Scotland: Grampian Regional Council -- Education Department.

McLeod, R. (1995). *Feedback on "Strathlethan" -- CD-i Research Seminar, 16th June 1995.* (Research report). Aberdeen, Scotland: Grampian Regional Council -- Education Department, Resources Service.

McLeod, R. (1994). *Review of parent/adult helpers in school -- Catterline Primary School.* (Research notes from group 2, January, 1994). Aberdeen, Scotland: Grampian Regional Council -- Education Department, Resources Service.

Merriam, S. B. (1988). *Case study research in education: A qualitative approach.* San Francisco: Jossey-Bass.

Miklos, E. (1984). The pursuit of excellence in educational administration. Paper presented at the National Conference of Professors of Educational Administration, University of Maine, Orono.

Millar, M. (1984). The use of simulations in training programs: A review. *Educational Technology,* 24 (11) 39-41.

Miles, M. B., & Huberman, A. M. (1984). *Qualitative data analysis: A sourcebook of new methods*. Beverly Hills, CA: Sage.

Millerson, G. (1972). *The technique of television production.* London, UK: Focal Press.

Milstein, M. (1993). *Changing the way we prepare educational leaders: The Danforth experience.* Newbury Park, CA: Corwin Press Inc.

Mortimer, G. (1994). *The evaluation of the use of an interactive video package as a training medium for principal teachers in Grampian secondary schools.* (Research report). Glasgow, Scotland: Strathclyde University, Faculty of Education, Jordanhill Campus.

Murphy, J. (Ed.) (1993). *Preparing tomorrow's school leaders: Alternative designs.* University Park, PA: UCEA Inc.

The National Commission on Excellence. (1987). *Leaders for America's schools: The report of the national commission on excellence in educational administration.* Tempe, AZ: The University Council for Educational Administration.

Neuman, D. (1989). Naturalistic inquiry and computer-based instruction: Rationale, procedures, and potential. *Educational Technology Research & Development,* 37 (3), 5-38.

Newell, A., & Simon, H. (1988). The Theory of human problem solving. In A. Collins & E. Smith (Eds.), *Reading in cognitive science: A perspective from psychology and artificial intelligence* (pp. 33-51). San Mateo, CA: Morgan Kaufman Publishers.

Northern Ireland Centre for Learning Resources. (n.d.). *QMS: Quality management in schools.* [Brochure]. Belfast, Ireland: Author.

Ogawa, R. T., & Malen, B. (1991). A response to commentaries on "towards rigor in reviews of multivocal literatures..." *Review of Educational Research*, 61 (3), 307-313.

O'Leary, A. (1994). *The administrative preparation simulation game.* Unpublished doctoral dissertation. Hofstra University.

Papert, S. (1980). *Mindstorms.* New York: Basic Books.

Patton, M. Q. (1990). *Qualitative evaluation and research methods.* (2nd. ed.). Newbury Park, CA: Sage.

Peterson, K. D., & Finn, C. E. (1988). Principals, superintendents, and the administrator's art. In D. Griffiths, R. Stout, and P. Forsyth (Eds.), *Leaders for America's Schools*, (pp. 89-108). Berkeley, CA: McCutchan.

Pitner, N. J. (1988). School administrator preparation: The state of the art. In D. Griffiths, R. Stout, and P. Forsyth (Eds.), *Leaders for America's Schools* (pp. 367-402). Berkeley, CA: McCutchan.

Polson, P., & Jeffries, R. (1985). Instruction in general problem-solving skills: Analysis of four approaches. In J. Segal, S. Chipman, & R. Glaser (Eds.), *Thinking and learning skills: Volum 1, Relating instruction to research*, (pp. 417-455). Hillsdale, NJ: Lawrence Erlbaum Associates.

Polson, P., & Jeffries, R. (1982). Problem solving as search and understanding. In

R. Sternberg (Ed.), *Advances in the psychology of human intelligence.* (Vol. 1) (pp. 413-463). Hillsdale, NJ: Lawrence Erlbaum Associates.

Ratsoy, E., Richards, D., Haughey, M., & Maynes, W. (1992). Becoming a principal, part 1: An innovative preparation program. *Canadian School Executive,* 11(9), 3-6.

Reeves, T. (1986). Research and evaluation models for the study of interactive video. *Journal of Computer-Based Instruction,* 13 (4), 102-106.

Reigeluth, C. & Schwartz, R. (1989). An instructional theory for the design of computer based simulations. *Journal of Computer Based Simulations,* 16 (1), 1-10.

Resnick, L. (1989). Introduction. In L. Resnick (Ed.), *Knowing, learning, and instruction* (pp. 1-24). Hillsdale, NJ: Lawrence Erlbaum Associates.

Richey, R. C. (1993) Instructional design and theory in a changing field. *Educational Technology*, 33 (2), 16-20.

Richey, R. C. (1992) *Designing instruction for the adult learner: Systemic training theory and practice.* London, UK: Kogan Page/Taylor and Francis.

Rogers, E. (1983). *Diffusion of innovations (3rd ed.).* New York, NY: The Free Press.

Romiszowski, A. (1981). *Designing instructional systems.* London, UK: Kogan Page.

Romiszowski, A., & Grabowski, B. (1989). Interactive video and cognitive structures: A technique for enhancing the effectiveness of interactive simulations and games. A paper presented at the Society for Applied Learning Technology Conference, Orlando, February, 1992.

Ruben, B., & Lederman, L. (1982). Instructional simulation gaming: Validity, reliability, and utility. *Simulation and games.* 13(2), 233-244.

Rumelhart, D. E. (1980). Schemata: The building blocks of cognition. In R. Spiro, B. Bruce, & W. Brewer (Eds.), *Theoretical issues in reading comprehension* (pp. 33-58). Hilsdale, NJ: Lawrence Erlbaum Associates.

Rumelhart, D. E., & Ortony, A. (1977). The representation of knowledge in memory. In R. C. Anderson, R. Spiro, & W. Montague (Eds.), *Schooling* *and the acquisition of knowledge* (pp. 99-136). Hillsdale, N. J.: Lawrence Erlbaum Associates.

Salomon, G. (1979). *Interaction of media, cognition and learning.* San Francisco, Jossey Bass.

Schön, D. (1983). *The reflective practitioner: How professionals think in action.* New York: Basic Books.

Schön, D. (1987). *Educating the reflective practitioner.* San Francisco: Jossey-Bass.

Scriven, M. (1967). *The methodology of evaluation.* (AERA monograph series on curriculum evaluation, No. 1). Chicago: Rand McNally.

Segiovanni, T. (1991). *The principalship: A reflective practice perspective.* Toronto, ON: Allen and Bacon.

Sergiovanni, T. (1989). Mystics, neats and scruffies: Informing professional practice in educational administration. *Journal of Educational Administration,* 27 (2), 7-21.

Smith, M., & Glass, G., (1987). *Research and evaluation in the social sciences.* Toronto, ON: Prentice-Hall.

Spilich, G., Vesonder, G., Chiesi, H., & Voss, J. (1979). Text processing of domain related information for individuals with high and low domain knowledge. *Journal of Verbal Learning and Verbal Behaviour*, 18, 275-290.

Spiro, R. (1977). Remembering information from text: The "state of schema" approach. In R. C. Anderson, R. Spiro, W. Montague (Eds.), *Schooling and the acquisition of knowledge.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Spiro, R. J., Feltovich, P. L., Jacobsen, L. J., and Coulson, R. L. (1991). Cognitive flexibility, constructivism, and hypertext: Random access instruction for advanced knowledge acquisition in ill-structured domains. *Educational Technology*, 31 (5), 24-33.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques.* Newbury Park, CA: Sage.

Turner, B. A. (1981). Some practical aspects of qualitative data analysis: One way of organizing the cognitive processes associated with the generation of grounded theory. *Quality and Quantity*, 15, 225-247.

Update: UCEA computer simulation project. (1993). *UCEA Review, 14*.

Vickers, G. (1965). *The art of judgement*. London, UK: Chapman & Hall.

Voss, J. F. (1989). Problem solving and the educational process. In A. Lesgold & R. Glaser (Eds.), *Foundations for a psychology of education* (pp. 251-294). Hillsdale, NJ: Lawrence Erlbaum Associates.

Wilson, K. (1988). *The Palenque design: Children's discovery learning experiences in an interactive multimedia environment*. Harvard University Doctoral Dissertation. Ann Arbor, MI: University Microfilms International.

Wittrock, M. (1978). The cognitive movement in instruction. *Educational Psychologist*, 13, 87-95.

Weinstein, C., & Underwood, V. (1985). Learning strategies: The how of learning. In J. Segal, S. Chipman, & R. Glaser (Eds.), *Thinking and learning skills: Volum 1, Relating instruction to research*, (pp. 241-258). Hillsdale, NJ: -- Lawrence Erlbaum Associates.

Wendel, F. C., & Bryant, M. T. (1988). *New directions for administrator preparation*. Tempe, AZ: The University Council For Educational Administration.

Wendel, F. C., & Sybouts, W. (1988). *Assessment center methods in educational administration: Past, present, and future*. Tempe, AZ: The University Council For Educational Administration.

Wolfe, J. (1985). The teaching effectiveness of games in collegiate and business courses: 1973-83 update. *Simulation and Games*, 16 (3), 251-288.

Yates, G. C. R., & Chandler, M. (1991). The cognitive psychology of knowledge: Basic research finding and educational implications. *Australian Journal of Education, 35(2), 131-153.*

Yin, R. K. (1991). Advancing rigorous methodologies: A review of "towards rigor in review of multivocal literatures..." *Review of Educational Research*, 61 (3), 299-305.

Yin, R. K. (1989). *Case study research: Design and methods*. Newbury Park, CA: Sage.

Zettl, H. (1973). *Sight, sound, motion; applied media aesthetics.* Belmont, CA: Wadsworth.

Zettl, H. (1990). *Sight, sound, motion; applied media aesthetics, Second Edition.* Belmont, CA: Wadsworth.

APPENDIX A

ED ADM 505

Course Outline

Winter Term 1990

January

3	Orientation
10	Orientation
17	Lab: In-Basket 1
24	Debriefing In-Basket 1
31	Group Tutorial 1 "The Concept of the Principalship"

February

7	Lab: In-Basket 2
14	Debriefing In-Basket 2
21	Reading Week
28	Group Tutorial 2 "Staff Dynamics - Role Plays"

March

7	Group Tutorial 3 "School-Based Management"
14	Lab: In-Basket 3
21	Debriefing In-Basket 3
28	Group Tutorial 4 "Professional Development Program Exercise"

April

4	Group Tutorial 5 "The Concept of the Principalship Revisited"

Appendix B
Ed. Admin. 505

Student Course Evaluation

Your instructors would like to have your opinion of the course generally, and the related simulation labs, seminars and tutorials. Your comments will help improve the course.

		strongly disagree strongly agree
1.	Overall, this was an excellent course	1 2 3 4 [✓ 5]
2.	Overall, the simulation labs were well prepared	1 2 3 4 [✓ 5]
3.	Overall, the simulation labs were very relevant to the course goals	1 2 3 4 [✓ 5]
4.	Overall, the debriefing seminars following up lab sessions were conducted in a way designed to help students learn the most from their lab activities	1 2 [✓ 3] 4 5
5.	Overall, the tutorial seminars were conducted in a way which would help students understand the principalship in the larger, more general context	1 2 3 4 [✓ 5]
6.	Overall, the tutorial seminars were conducted in way which would help students better understand their management style and approach to being a principal	1 2 3 [✓ 4] 5
7.	The instructors were helpful in my efforts to be reflective and to develop my concept of the principalship	1 2 3 4 [✓ 5]
8.	I learned to apply concepts/principles to management situations in this course	1 2 3 4 [✓ 5]
9.	I developed the ability to solve real problems in this field	1 2 3 4 [✓ 5]
10.	I was stimulated to do outside reading about the course material	1 2 3 4 [✓ 5]
11.	I gained a better understanding of myself through this course	1 2 3 4 [✓ 5]
12.	I developed skill needed by professionals in this field	1 2 3 4 [✓ 5]
13.	The exit interview was helpful to me in arriving at an overall assessment of my performance in the course	1 2 3 4 5
14.	The amount of work required was appropriate for the credit received	1 2 3 4 [✓ 5]
15.	The essay assignment was helpful to me in achieving the course purpose	1 2 3 4 [✓ 5]
16.	The orientation videotapes in this course were interesting and stimulating	1 2 3 4 [✓ 5]
17.	The pre-lab briefings and memory flash videotapes in this course were interesting and stimulating	1 2 3 4 [✓ 5]
18.	The presentation of in-basket items on videotape in this course were interesting and stimulating	1 2 3 4 [✓ 5]
19.	The problems in the in-baskets were interesting and stimulating	1 2 3 4 [✓ 5]
20.	The range of problems in the in-baskets seemed to represent the range and difficulty of problems dealt with by principals	1 2 3 4 [✓ 5]
21.	The telephone calls in the labs were a valuable part of my learning in this course	1 2 3 4 [✓ 5]

22. Please list at least two aspects of the course which you liked best:

23. Please list at least two aspects of the course which you liked least:

24. Please offer any other comments or suggestions you feel would be valuable in improving this course:

Please mail the completed
questionnaire to the
instructors in the
attached envelope.

Appendix C

Outline of Questions For Semi-Structured Interviews
With Students In Ed. Adm. 595

Winter Term 1991

1. A leading question related to the number of In-Basket items they completed.

2. A question related to the strategy they used to work through the items in the simulation. Have they used only this strategy? How does it compare to how they work in a real office setting?

3. Did they consider using any other strategies?

4. A series of specific questions related to specific observations of their work on particular items and problems that ensued.

5. What was the most difficult item for them and why?

6. Did they have any problems (Do they have any comments) on the system provided for moving around in the program?

7. A question on the use they made of reference materials and files during the simulation.

8. A question on whether or not they used staff profiles during the simulation.

9. A question on how real the problems seemed to them.

10. A question on how real the simulation was for them.

11. A series of questions on how adequate they found the orientation, with regard to:
    a. The video materials
    b. The Practice In-Basket
    c. The file and reference materials
    d. Related class activities

12. Several questions related to what they are learning, and how they are learning it:
    a. How does the simulation relate to their perception of their learning.
    b. How does reading theory relate to the simulation? to journaling?
    c. What role does the debriefing play in their learning?
    d. To what extent is learning to be an administrator learning to exercise good judgment?
    e. How does one learn judgment (if one can)?
    f. What role does this blend of simulation, seminars, reading, and journaling work to promote learning judgment?

13. (If they have not already suggested this in the course of the interview) What would you suggest to improve the simulation?

14. What other things had you thought I might ask you that I didn't? Is there anything else you would like to tell me about the simulations or the course?

Telephone Caller's Report

Role assumed by caller ______________________ **Number of person called** _______ **Date** ____________

Time call placed ______ **Time call completed** _______

A. From the perspective of the person whose role you have assumed, describe in one sentence your reaction to the way the principal handled your call.

B. **From the detached viewpoint of an "expert", assess the quality of communication skills demonstrated by the principal by rating the calls on the following scale. The principal handled the call:**

			poorly		fairly well	in exemplary fashion		
1.	a.	overall assessment	1	2	3	4	5	N/A
	b.	the principal gave evidence of clearly understanding you	1	2	3	4	5	N/A
	c.	the principal communicated his/her point of view clearly	1	2	3	4	5	N/A
	d.	the principal demonstrated sensitivity to your feelings	1	2	3	4	5	N/A
	e.	the principal worked to facilitate an understanding of the nature of your problem and its importance to you	1	2	3	4	5	N/A
	f.	the principal explored alternative solutions with you	1	2	3	4	5	N/A
	g.	a strategy for resolution was agreed upon	1	2	3	4	5	N/A
	h.	the principal inspires trust and confidence in his/her ability to deal with this problem	1	2	3	4	5	N/A

2. What strong points in communication would you want to call to the principal's attention?

3. In what areas should the principal seek to improve in order to better communicate with people in situations such as this?